REPORT

OF THE

MINISTER OF AGRICULTURE

FOR THE

DOMINION OF CANADA

FOR THE YEAR ENDED MARCH 31

1912

PRINTED BY ORDER OF PARLIAMENT

OTTAWA
PRINTED BY C. H. PARMELEE, PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1912

[No. 15—1913.]

TABLE OF CONTENTS.

REPORT

OF THE

MINISTER OF AGRICULTURE

1911-12

To Field Marshal, His Royal Highness Prince Arthur William Patrick Albert, Duke of Connaught and of Strathearn, Earl of Sussex (in the Peerage of the United Kingdom), Prince of the United Kingdom of Great Britain and Ireland, Duke of Saxony, Prince of Saxe-Coburg and Gotha; Knight of the Most Noble Order of the Garter; Knight of the Most Ancient and Most Noble Order of the Thistle; Knight of the Most Illustrious Order of Saint Patrick; One of His Majesty's Most Honourable Privy Council; Great Master of the Most Honourable Order of the Bath; Knight Grand Commander of the Most Exalted Order of the Star of India; Knight Grand Cross of the Most Distinguished Order of Saint Michael and Saint George; Knight Grand Commander of the Most Eminent Order of the Indian Empire; Knight Grand Cross of the Royal Victorian Order; Personal Aide-de-Camp to His Majesty the King; Governor General and Commander-in-Chief of the Dominion of Canada.

MAY IT PLEASE YOUR ROYAL HIGHNESS:

I have the honour to submit to Your Royal Highness a report of the Department of Agriculture for the fiscal year ended March 31, 1912:—

I.—GENERAL REMARKS.

The work of the department has been carried on efficiently, and a synopsis of the operations of the various branches comprised therein is laid before Your Royal Highness under their respective headings.

The operations of this department were carried on under the direction of the Honourable Sydney Fisher up to the 6th October, 1911, being the date on which the late government resigned.

The legislation affecting the department during this period consisted of:—

Chapter 23, 1-2 George V, intituled 'An Act respecting the Inspection and Sale of Seeds.'

By an order in Council of June 8, 1911, under the provisions of Chapter 75, R.S.C., 1906, regulations were established relating to mange in cattle in certain portions of the provinces of Saskatchewan and Alberta. (See Appendix No. 16).

Vide *Canada Gazette,* Vol. XLIV, pp. 4266.

By an Order in Council of June 8, 1911, under the provisions of Chapter 75, R.S.C., 1906, regulations were established relating to mange in cattle in certain portions of the province of British Columbia. (See Appendix No. 17).

Vide *Canada Gazette,* Vol. XLIV, pp. 4267.

By an Order in Council of June 8, 1911, in virtue of the provisions of Chapter 75, R.S.C., 1906, intituled 'The Animal Contagious Diseases Act,' the regulations relating to hog cholera and swine plague established by Order in Council of December 6, 1904, were rescinded and new regulations substituted therefor. (See Appendix No. 18).

Vide *Canada Gazette,* Vol. XLIV, pp. 4265.

By proclamation dated June 14, 1911, under the provisions of Chapter 68, R.S.C., 1906, Part II, the country was divided into census districts and subdistricts.

Vide *Canada Gazette,* Vol. XLIV (Supplement June 10, 1911).

By an Order in Council of June 30, 1911, in virtue of the provisions of Section 3, Chapter 31, 9-10 Edward VII, intituled 'An Act to prevent the introduction or spreading of insects, pests or diseases destructive to vegetation,' the regulations established by Order in Council of date May 11, 1910, were amended by adding to Section 12 thereof 'Chestnut Bark Disease, (Diaporthe parasitica,' and also by adding a new section as follows:—

'13½. The importation of both Chestnut, (Castanea dentata), and Chinquapin, '(Castanea pumila), into Canada from the United States is prohibited.'

Vide *Canada Gazette,* Vol. XLV, pp. 92.

By an Order in Council of June 30, 1911, the regulations established by Order in Council of date April 18, 1910, in virtue of the provisions of Chapter 128, R.S.C., 1906, intituled 'An Act respecting the inspection and sale of seeds,' were rescinded, Chapter 128 R.S.C., 1906, and Chapter 54 of statutes of 1910 having been repealed.

Vide *Canada Gazette,* Vol. XLV, pp. 92.

By an Order in Council of July 5, 1911, in virtue of the provisions of Section 2, of 'The Seed Control Act,' 1911, regulations were established. (See Appendix No. 19).

Vide *Canada Gazette,* Vol. XLV, pp. 173.

By an Order in Council of July 22, 1911, the regulations relating to Sheep Scab established by Order in Council of date March 31, 1905, in virtue of 'The Animal Contagious Diseases Act,' were rescinded, and new regulations substituted therefor (See Appendix No. 20).

Vide *Canada Gazette,* Vol. XLV, pp. 330.

SESSIONAL PAPER No. 15

By an Order in Council of July 22, 1911, the regulations relating to Anthrax established by Order in Council of date August 18, 1906, in virtue of 'The Animal Contagious Diseases Act,' were rescinded, and new regulations substituted therefor. (See Appendix No. 21).

Vide *Canada Gazette,* Vol. XLV, pp. 330.

By an Order in Council of July 22, 1911, the regulations relating to Mange established by Order in Council of date June 27, 1904, in virtue of 'The Animal Contagious Diseases Act' were rescinded, and new regulations substituted therefor. (See Appendix No. 22).

Vide *Canada Gazette,* Vol. XLV, pp. 331.

By an Order in Council of July 22, 1911, the regulations relating to Maladie du Coit established by Order in Council of date July 22, 1905, in virtue of 'The Animal Contagious Diseases Act,' were rescinded, and new regulations substituted therefor. (See Appendix No. 23).

Vide *Canada Gazette,* Vol. XLV, pp. 331.

By an Order in Council of August 19, 1911, in virtue of the provisions of Chapter 75, R.S.C., 1906, intituled 'An Act respecting infectious and contagious diseases affecting animals,' the regulations relating to Animals Quarantine established by Order in Council of date November 30, 1909, were amended as follows:—

Section No. 34 is hereby rescinded and the following substituted therefor:

'*Section* 34.—Horses, mules, and asses shall be inspected and, if so ordered by the Minister, may be detained, isolated, dipped, or otherwise treated, or, in default of such order, where the inspector has reason to believe or suspect that the animals are affected with, or have been exposed to contagious or infectious disease.'

Section No. 35 is hereby rescinded and the following substituted therefor:

'*Section* 35.—Horses, mules, and asses must be accompanied by:—

(*b*) A similar certificate from a reputable veterinarian, provided such certificate is endorsed by an inspector of the said Bureau of Animal Industry; or,

(*c*) A similar certificate from an inspector of the Canadian Department of Agriculture.

When not so accompanied horses, mules, and asses must be submitted to the mallein test either at the quarantine station where entry is made or at point of destination under such restrictions as the Veterinary Director General may prescribe.'

Section No. 87 is hereby rescinded and the following substituted therefor:

'*Section* 87.—Any inspector may at any time when he deems such action necessary or advisable, order any steamship, steam, or other vessel, railway car, or other vehicle, used for the conveyance of animals to be cleansed and disinfected to his satisfaction, as provided by Section 86, at the expense of the person or company owning or operating same, and may prohibit the use or removal of such vessel, car, or other vehicle, until his orders in regard to cleansing and disinfection have been properly carried out.

Shippers may refuse to place their animals on any unclean or unsanitary vessel, car, or other vehicle, and may lodge a complaint with the nearest inspector who, if he deems such action necessary or advisable, may exercise the powers conferred upon him by this section.'

By an Order in Council of August 19, 1911, in virtue of the provisions of Chapter 7, R.S.C., 1906, intituled 'An Act respecting infectious and contagious diseases affecting animals,' regulations were established with regard to contagious disease in horses in certain portions of the provinces of Saskatchewan and Alberta. (See Appendix No. 24).

Vide *Canada Gazette,* Vol. XLV, pp. 789.

By an Order in Council of January 20, 1912, in virtue of the provisions of Chapter 74, R.S.C., intituled 'An Act respecting Quarantine,' the Quarantine Regulations established by Order in Council of June 12, 1907, were amended, with a view of making provision against the introduction of disease into the country from the importation of Chinese Hair, to wit:—

The following paragraph shall be inserted after the word 'solutions' in the twenty-second line on page 15 of the printed Quarantine Regulations:

'Human or other hair unmanufactured or uncleaned must be unpacked, and disinfected by steam, or boiling water, before it is allowed entry into Canada.'

The following question shall be inserted on page 22 after the word 'cargo' in question No. 4:

'Is there any human or other hair unmanufactured or uncleaned in such cargo?'

By an Order in Council of March 30, 1912, in virtue of the provisions of Section 6, Chapter 67, R.S.C., 1906, the Census and Statistics Branch of my department was transferred to the Department of Trade and Commerce as from April 1, 1912.

The Ninth International Congress of Agriculture was held in Madrid, Spain, during the first week in May last.

The Honourable Arthur Boyer and Mr. Thomas Kelville Doherty, B.C.L., L.L.B., were appointed delegates to represent Canada. A report thereon is appended. (See Appendix No. 25).

The Third General Assembly of the International Institute of Agriculture was held in Rome, opening on the 14th May last.

The Honourable Arthur Boyer and Mr. Thomas Kelville Doherty were appointed delegates to represent Canada at the General Assembly, the former to be regular delegate to the Permanent Committee of the Institute. A report thereon is appended hereto. (See Appendix No. 26).

A Conference of the International Union for the Protection of Industrial Property was held in Washington, D.C., beginning on May 15 last, and ending on June 2 last, in the deliberations of which Canada participated. Mr. Geo. F. O'Halloran, Deputy

Minister of Agriculture, and Mr. P. E. Ritchie, Registrar of Copyrights and Trade Marks, were the delegates appointed to represent Canada.

The proposition that Canada should be permitted to adhere to the convention, subject to the reservation of certain articles, was not acceded to, and consequently the Dominion of Canada still remains a non-union country. This being the case the provisions of the convention in detail are not of immediate interest, with the exception of Article 16, (bis) which is in part as follows: 'The contracting countries have the right of acceding to the present convention at any time on behalf of their colonies, dependencies and protectorates or any of them. Under the same conditions the contracting countries may denounce the convention on behalf of their colonies, possessions, dependencies and protectorates, or any of them.' The delegation of Great Britain made a declaration to the effect that the word colonies was understood to extend to, and embrace the great self-governing Dominions of the Empire.

In connection with the above Article 16, (bis), the following declaration by the British delegation is of particular interest to Canada:—

'The British government considers that certain of the British Dominions adhering to the convention, which possess powers to legislate on matters of industrial property, should be represented at the conference of the International Union by delegates who should have the same right to vote as is accorded to the delegates of contracting countries, it being understood that the Dominions shall contribute in the same manner as the other Unionist States to the expense of the International Bureau.'

Canada's position with respect to the proposed convention is clearly set forth in the declaration of the Canadian delegation, a translation of which is hereto appended. (See Appendix No. 27).

Upon an invitation from the Dutch government, Canada was represented at the Thirteenth International Anti-Alcohol Congress held at Scheveningen in The Hague, Holland, September 11 to 16 last.

The Honourable Mr. Justice Eugene Lafontaine, of Montreal, Que., and Mr. Francis S. Spence, of Toronto, Ontario, were appointed delegates to represent Canada at this congress. A brief memorandum of the proceedings of the congress has been submitted by the Canadian delegates, and will be found herein. (See Appendix No. 28).

I have to report the retirement at the end of the present fiscal year of a valued officer of the department, Dr. J. G. Rutherford, C.M.G., V.S., H.A.R.C.V.S., who had held the position of Veterinary Director General and Live Stock Commissioner for some years past.

Too much credit cannot be given to Dr. Rutherford for the efficient manner in which he organized and administered these two branches of my department. No appointment has as yet been made to fill the vacancy caused by Dr. Rutherford's retirement.

Canada's participation in the Festival of Empire and Imperial Exhibition held at the Crystal Palace, London, England, was a most creditable display of the resources and natural products of the country. It attracted much attention and obtained the greatest success.

A report on this exhibition, which was officially opened by His Majesty the King on May 12, 1911, and closed on October 31 last, is appended hereto. (See Appendix No. 29).

The Report by the Tobacco Expert, Mr. F. Charlan, gives encouraging results in connection with the past season's work of this branch, and will be found as an appendix to this report. (See Appendix No. 30).

ARTS AND AGRICULTURE.

DAIRY AND COLD STORAGE BRANCH.

The services relating to dairying, fruit, extension of markets and cold storage are grouped together to form the Dairy and Cold Storage Branch. At the head of this branch is the Dairy and Cold Storage Commissioner, who is assisted by experts for each of the divisions mentioned.

THE DAIRYING SEASON OF 1911.

The season of 1911 was marked by a long period of hot dry weather which prevailed over the greater part of the Northern Hemisphere, and which seriously curtailed the production of milk in many countries. The strong demand thus created forced the wholesale prices of butter and cheese to the highest point ever reached in Canada since the export trade began. Although the season was somewhat unfavourable for the production of milk, it is satisfactory to note that there has been, on the whole, some increase in production.

I am informed that the dairying industry in the Maritime Provinces is showing signs of new life and there is likely to be a considerable increase in the manufacture of creamery butter in Nova Scotia.

THE EXPORT TRADE.

The total exports for the year show a slight increase in value as compared with 1910-11. There was also an increase in the exports of butter, against which there was a decline in the quantities of cheese and cream exported.

The statistical position of the international trade in dairy produce seems to be very strong at present. The shortage in the Northern Hemisphere in 1911 was followed by a further shortage in the output of butter in Australasia for the season of 1911-12. On the whole the situation is very encouraging for Canadian dairy farmers.

THE HOME TRADE.

The home trade continues to expand with the increase of population. This accounts for the small increase in the exports. A large quantity of butter and cheese

is now shipped from Ontario and Quebec to the western provinces. The demand for market milk to supply the needs of the larger towns and cities is having a very appreciable effect on the cheese and butter-making industries, and many factories have been converted into milk or cream shipping stations.

DAIRYING EXPERIMENTS.

The investigation which was begun in 1910, having for its object an improvement in the quality of cream supplied to cream gathering creameries, was concluded during the past season, and the results have been published in bulletin form for distribution among the patrons of the creameries.

NEW DAIRY STATIONS.

I have been pleased to authorize the purchase of a creamery business at Brome, P.Q., with the object of erecting a new building to be operated as a model creamery and to provide at the same time the necessary facilities for carrying on creamery investigations.

I have also authorized the purchase of two cheese factories at Finch, Ont. A new combined cheese factory and creamery will be erected to take the place of the two old ones, and this factory will also be conducted as a model cheese factory with facilities for the manufacture of butter in the winter months. It will be equipped for experimental work.

COW TESTING ASSOCIATIONS.

The cow testing propaganda has been continued and extended during the year. Dairy Record Centres, which were first organized in the spring of 1911, have proved to be so successful that I have authorized further extension along this line.

CONFERENCE OF DAIRY EXPERTS.

On the recommendation of the Dairy and Cold Storage Commissioner, I was pleased to authorize the holding of the Third Conference of Dairy Experts under the auspices of the Dairy and Cold Storage Branch. I have reason to believe that these conferences are very beneficial from a technical standpoint, and that they serve the very useful purpose of securing uniformity in the methods adopted by the various dairy instructors throughout the Dominion. A verbatim report of the proceedings of this conference is being published.

EXTENSION OF MARKET DIVISION.

The refrigerator car services for the carriage of butter, cheese and fruit was arranged for with the railway companies as in former years. The inspection of the refrigerator cars was carried on by a staff of six inspectors, three of whom were engaged as travelling inspectors, following the cars over the routes on which they operate, and the other three were located in Montreal to watch the arrival of the cars and report on their condition as regards icing, cleanliness, etc.

The cargo inspection service at Montreal, Quebec and Halifax, and also at the ports of London, Liverpool, Manchester and Bristol, was continued and made more general in its application than in any previous year.

THERMOGRAPH RECORDS.

Thermograph records of the temperature in the cold storage chambers and holds of steamers were secured in practically every ship sailing to Great Britain from Montreal and Quebec during the period of navigation in the St. Lawrence, and also in the steamers carrying cheese from Halifax during the summer months, and those carrying apples during the apple-shipping season.

Some records have also been obtained in the steamers sailing to South Africa from Montreal, and to New Zealand and Australia from Vancouver.

THE FRUIT DIVISION.

The season of 1911 was notable for the record crop of apples produced in Nova Scotia. Reliable statistics give the total shipments from the province as 1,580,496 barrels. Apple growing in Nova Scotia is making rapid strides and a number of new orchards are just coming into bearing, but the big crop was largely due to the fact that all the trees were heavily loaded. For the first time in the history of the apple trade in this country, large quantities of Nova Scotian apples were shipped to Ontario; Quebec and the prairie provinces. 100,000 barrels are said to have been shipped to points west of the Great Lakes, and 76,000 barrels to Ontario and Quebec.

The apple crop of 1911 was unusually free from the defects which arise from the prevalence of fungous pests of one kind or another.

The berry crop in Ontario was cut very short by the hot dry weather which prevailed at the time of harvesting.

THE THIRD DOMINION CONFERENCE OF FRUIT GROWERS.

I was pleased to be able to arrange for the Third Dominion Conference of Fruit Growers which was held under the auspices of the Dairy and Cold Storage Branch on February 14, 15 and 16. There were 42 regularly accredited delegates present, representing the provincial fruit growers' associations, the provincial departments of agriculture, the agricultural colleges, the co-operative societies and the apple shippers' associations.

A full report of the proceedings of the conference is being published for general distribution.

SPECIAL INQUIRY INTO THE FRUIT GROWING INDUSTRY.

A special inquiry into the fruit growing industry was undertaken during the year, under the direction of Mr. J. A. Ruddick, Commissioner in charge of the Branch, the services of Mr. W. H. Bunting of St. Catharines having been secured for that purpose. Mr. Bunting visited all the fruit growing districts in the Dominion, and his report is now being printed and will be available for distribution in a short time.

FRUIT INSPECTION.

The administration of the Fruit Marks Act is an important part of the work of the Fruit Division. Five additional temporary inspectors were appointed during the year. One of these was located at Saskatoon, Sask., and the others were attached to the Ontario and Montreal section. Although the number of actual examinations were greatly in excess of any former year, it is gratifying to be able to state the number of violations were not as numerous as in 1909 or 1910. This was probably due partly to improved packing and partly to the cleaner condition of the crop.

THE FRUIT CROP REPORT.

The monthly edition of the Fruit Crop Report, from May to September, was continued. The compilation of this report calls for care and judgment and an intimate knowledge of the fruit growing conditions in Canada.

FRUIT FOR INTERNATIONAL EXHIBITIONS.

I am informed that the apples collected by the Dairy and Cold Storage Branch in the autumn of 1910 were sufficiently well-preserved to maintain a continuous exhibit at the Festival of the Empire Exhibition at the Crystal Palace, London, during the past summer. These apples were shipped to London in April and held in cold storage, a quantity being removed from time to time as was necessary to renew the exhibit. During the month of September, a further consignment of choice, specially packed, McIntosh Red and Fameuse apples were forwarded to the exhibition where they attracted much attention. A consignment of 195 single layer cases of Elberta peaches was also sent to this exhibition. They arrived in perfect condition and were on exhibition for several weeks.

A further collection of winter apples was made in October last and some 700 boxes are now held in cold storage at Toronto, Montreal and St. John to be forwarded during the next few weeks to the Exhibition Commissioner in London.

COLD STORAGE.

The usual bonus of $100 has been paid to creameries for the erection of suitable cold storages. There were 65 applications received for the bonus during the year. Of this number 47 were approved and received the full bonus.

COLD STORAGE SUBSIDIES.

Six contracts were entered into during the year for the payment of cold storage subsidies with the following firms or persons:—

Campbell and Hamilton, Calgary, Alta.
The Edmonton Produce Co., Edmonton, Alta.
The Moosejaw Cold Storage Co., Moosejaw, Sask.
Moore and Bidwell, Saskatoon, Sask.
The City Cold Storage Co., Regina, Sask.
J. H. Sansregret, Joliette, Qué.

Applications are now (March 31, 1912) under consideration from:—

The Brantford Cold Storage Co., Brantford, Ont.
O'Keefe and Drew, Chatham, Ont.
Central Canada Terminal Storage Co., Fort William, Ont.
Brandon Creamery and Supply Co., Brandon, Man.
Standard Fish and Fertilizer Co., Queen Charlotte Islands, B.C.

CORRESPONDENCE.

In addition to the routine correspondence connected with the oversight of a large outside staff, the administration of the Cold Storage Act, and Parts VIII and IX of the Inspection and Sale Act, there are a large number of technical inquiries received by the Commissioner and his assistants relating to the production of milk, dairy manufactures, fruit growing, the cold storage and marketing of perishable farm products, etc.

PUBLICATIONS.

The following publications have been added to the Dairy and Cold Storage series during the year:—

The Annual Report of the Dairy and Cold Storage Commissioner, ending March 31st, 1911.

BULLETINS.

No. 28. The Dairy Industry in Canada.
No. 29 Notes for Factory Cheesemakers.
No. 30. Cream Cheese.
No. 31. A List of the Cheese Factories, Creameries, and Condensed Milk Plants in Canada.
No. 32. The Care of Cream for Buttermaking.

CIRCULARS.

No. 4. Creamery Cold Storage Bonuses.

SPECIAL REPORTS.

Report of the Third Dominion Conference of Dairy Experts.
Report of the Third Dominion Conference of Fruit Growers.
Report of a Special Inquiry into the Fruit Growing Conditions in Canada. By Mr. W. H. Bunting.

MEETINGS.

The permanent fruit inspectors and officers of the Dairy Division have attended and addressed a large number of meetings during the year.

THE ANNUAL REPORT.

A detailed report of the work of the Dairy and Cold Storage Branch is being prepared as an Appendix to this report and will be published as a separate volume.

SESSIONAL PAPER No. 15

SEED COMMISSIONER'S BRANCH.

The work of the Seed Branch has increased greatly during the past year, and some changes have been made in the general educational policy looking to giving more encouragement to the production and use of high class seed. As in previous years, the efforts of the Seed Branch have been directed principally to encouraging the production and dissemination of superior seeds, testing seeds for farmers and seed merchants, and securing the observance of the Seed Control Act. The unfavourable climatic conditions in the different provinces last fall, resulted in reduced yields and impaired quality of grass and clover seed, and cereal grains. This, combined with the new and more stringent regulations governing the sale of clover and timothy seed, made the work more difficult than usual and necessitated increasing the staff of temporary clerks and seed inspectors; but I am glad to be able to report that the work has been done efficiently and promptly, and I trust with results highly beneficial to the country at large.

Beside the temporary help employed, the staff has been strengthened by the appointment of three more permanent officers. A district representative has been appointed for British Columbia with headquarters at Vancouver, one for the province of Alberta with headquarters at Calgary, and the province of Ontario has been divided into two districts and a representative appointed for western Ontario with headquarters at Guelph.

SEED GRAIN SUPPLY.

The unfavourable weather conditions during the summer and autumn of 1911 resulted in a shortage of good seed grain in many parts of Canada. In western Ontario, parts of the Maritime Provinces, especially Prince Edward Island and some districts of Nova Scotia, the oat crop was badly injured by drought in the summer, with the result that the supply of seed oats was short in many districts which ordinarily have a surplus of good seed for outside points. In the prairie provinces the cool summer and early frosts effected considerable damage to the late sown crops. In some districts much of the grain was practically useless for seed, and it was deemed expedient to make the condition of the seed supply a subject for special investigation. A number of special inspectors were employed to visit the various districts, obtain information and collect samples which were forwarded to the Ottawa and Calgary seed laboratories for germination test. The investigation showed that there were comparatively few districts where there was not sufficient seed for local requirements. A full report giving the results of the investigation was published in bulletin form and widely distributed among the settlers in the districts affected. Information regarding the available supplies of good seed was also collected and made available to those desiring to purchase seed.

INSPECTION OF SEED GRAIN DISTRIBUTED TO HOMESTEADERS.

At the request of my colleague, the Honourable the Minister of the Interior, I instructed my Seed Commissioner to have his staff undertake the work of inspecting

the seed grain purchased by the Immigration Branch for distribution to homesteaders in the prairie provinces. The seed grain so distributed is sown on new and clean land, and it is important that it should be as free as possible from noxious weed seeds and be capable of germinating well. With that in view I was pleased to be able to assist my colleague by placing my experts in seed grain at his disposal and believe that much has been accomplished toward giving the homesteaders satisfactory service in supplying them with pure seed grain.

CONDITION OF THE TRADE IN GRASS AND CLOVER SEEDS.

The red clover and alsike seed crop of 1911 was very much below normal in point of area and total seed produced. The extremely dry and hot weather of the summer seasons of 1910 and 1911 that prevailed throughout the principal grass and clover seed producing districts contributed to make the supply of seed unusually short and the prices commensurately high. Instead of Canada exporting large quantities of clover seeds to Europe, supplies were largely imported from other countries. The short crop of Canadian grown seed has made it very difficult for seedsmen to secure local supplies of seed of superior quality.

ADMINISTRATION OF THE SEED CONTROL ACT.

The Seed Control Act of 1911 requires that red clover alsike, alfalfa and timothy seed shall, when exposed for sale, be graded according to fixed standards of quality. These new regulations have been well received by both farmers and seedsmen, and, in spite of the abnormal conditions of the seed supply, the Act has been well observed and has resulted in much improvement in the commerce of these seeds. Seed inspection work is being carried on more thoroughly this spring than ever before and all inspectors are instructed to endeavour to secure the observance of the Act by education and moral suasion. The advantages of having our principal grass and clover seeds, when exposed for sale, properly marked with a grade name in order to make it as easy as possible for farmers to purchase seeds of definitely known quality, appeal to seedsmen and farmers alike.

FIELD CROP COMPETITIONS AND SEED FAIRS.

For several years it has been the policy of the Seed Branch to encourage the production and use of good seed by assisting in organizing and conducting field crop competitions, seed fairs and provincial seed exhibitions in the various provinces. As this work is really provincial in character, the provinces gradually took it over, until last summer assistance was given by the Seed Branch only in Alberta, Quebec and the Maritime Provinces. In order to render equally substantial assistance on a basis equitable and agreeable to all the provinces and also to hand over to them and their agricultural societies the full control and responsibility for organizing and conducting these institutions, I authorized the payment to each province of subvention according to the amount of work accomplished. Under the new arrangement each province may be reimbursed to the extent of two-thirds of the moneys paid out in prizes at field

crop competitions, seed fairs and provincial seed exhibitions, the total amount of subvention not to exceed $50 for each seed fair, $50 for each kind of crop in a field crop competition, the total not to exceed $150 for any one agricultural society; and $400 for a provincial seed exhibition. The total amount available to each province is limited by the area under cultivation in field crops as shown by the census returns. Each province is entitled to receive up to $1,000, and those provinces which have a greater area than 1,000,000 acres under field crops may receive subvention in the ratio of $1,000 for each million acres of land under field crops. Under this arrangement approximately $30,000 is made available to the provinces for the purpose of encouraging the production and use of good seeds.

CANADIAN SEED GROWERS' ASSOCIATION.

At the last annual convention of the Canadian Seed Growers' Association important amendments to the constitution were adopted which should serve to make the work of seed selection and growing more attractive and remunerative. Under the new regulations the work of selection is made simpler and the farmer is enabled to grow a much larger quantity of seed eligible for registration. Both the growing crops and the threshed grain will be inspected by officers approved by the association, and if satisfactory the grain will be sealed by the inspectors before it leaves the premises of the growers. In this way the interests of both the grower and purchaser will be protected. The new system has given good satisfaction thus far and the rapidly increasing demand for seed of superior quality will doubtless tend to stimulate a large number of careful farmers to make seed growing a special feature of their farming operations. Financial assistance to the association, sufficient to enable it to carry on efficient educational work, has again been granted and the officers of the Seed Branch have been instructed to continue to co-operate in the inspection and educational work of the association.

IMPROVEMENT IN PASTURE AND FODDER PLANTS.

A start was made last season in an attempt to improve the grasses, clovers and fodder plants in Canada. This work is in charge of Dr. M. O. Malte who came to the Seed Branch staff from Sweden in the fall of 1910, and is about to be transferred to the Experimental Farms Branch. The work last summer consisted largely in making a survey of the flora of Canada which may be utilized for producing improved kinds and varieties of cultivated fodder and pasture plants. A short time was spent in each province and much material was collected that promises to be useful for the purpose of breeding and selecting.

TRIAL PLOTS OF FIELD ROOT SEEDS.

A series of trial plot tests has been inaugurated with field root seeds, with the object of securing definite information regarding their quality in respect to the genuineness of the seed stock imported and sold in Canada. There are well defined forms of mangels, carrots and turnips which are recognized as distinct varieties by seed growers in the countries from which we import our seed supplies. There is also some

variation within the distinct varieties, due to the work of selection by different growers, and this has led to a confusing multiplicity of nomenclature as applied to variety forms, some of which are carefully grown and selected while others appear to be markedly inferior and impure.

In working out the results of these trial plot tests, an endeavour will be made to associate, as far as possible, each kind and variety with definitely known standard type forms; and in presenting the information it is contemplated that the names of the varieties under which the seeds are sold will be given, together with the standard type to which the variety belongs. It is the intention to continue this work during three consecutive years at least before the information gained will be made public, and it is believed that by that time reliable results will be obtained.

SEED TESTING FOR FARMERS AND MERCHANTS.

The light crop of comparatively impure clover seed produced in Canada, the exceptionally large amount of Ottawa valley timothy that was threshed for seed late in the season, the new regulations of the Seed Control Act requiring clover and timothy seed to be graded, and the injury to the cereal crop in the prairie provinces, all combined to make the work of seed testing for farmers and seed merchants much heavier than ever before. From April 1, 1911, to March 31, 1912, the number of samples received at the Ottawa seed laboratory was 9,959 which, with the 1,391 samples tested in connection with investigation of the seed supply, made a total of 11,350 compared with 6,180 the previous year, an increase of 83 per cent. The samples tested for purity and graded were: Red clover, 2,336; alsike, 1,434; alfalfa, 357; timothy, 2,171; total, 6,298, compared with 4,111 the previous year, an increase of 53 per cent. The greatest increase was in the number of the timothy samples tested, which rose from 821 to 2,171. The samples of wheat, oats, barley and flax tested for germination, apart from those tested in connection with the investigation, totalled 1,909, divided as follows: Wheat, 529; oats, 1,037; barley, 179; flax, 164. The proportion of samples germinating below 63 per cent, was: Wheat, 11 per cent; oats, 30 per cent; barley, 28 per cent; flax, 16 per cent. In the previous year the tests were, total, 318; wheat, 83; oats, 185; barley, 25; flax, 25; and the proportion below 63 per cent was: Wheat, 5 per cent; oats, 11 per cent; barley, 12 per cent; flax, 8 per cent.

At the Calgary seed laboratory the number of samples tested during the year ending March 31, 1912, was very much in excess of any other year, nearly equalling the total previously tested since the laboratory was established in January, 1907. The great bulk of the tests were for germination as the laboratory was very extensively used by farmers for determining the vitality of their grain that had been injured by frost. The total number of samples received was 9,178 compared with 1,281 in the previous year. Of these, 8,792 were tested for germination. The samples of wheat, oats, barley and flax received from Alberta for germination test totalled 7,114, divided as follows: Wheat, 1,272; oats, 4,961; barley, 687; flax, 194. The number of samples germinating below 63 per cent was: Wheat, 109; oats, 1,814; barley, 103; flax, 23. There was also a marked increase in purity work, the number of samples being 720, compared with 113 the previous year.

PUBLICATIONS.

During the year several ordinary and special bulletins have been published for distribution. The special bulletins include: Summary Results of Competitions in Standing Fields of Grain in Alberta, 1911; Summary Results of Competitions in Standing Fields of Seed Grain in Quebec, New Brunswick, Nova Scotia and Prince Edward Island, 1911; and The Seed Grain Supply Manitoba, Saskatchewan and Alberta, 1912. The ordinary reports and bulletins now available include: The Seed Commissioner's Report, which contains a summary of the work of the Seed Branch since its organization with much information regarding seed testing, seed improvement and relative work; bulletin No. S-6, which includes a reprint of the Seed Control Act, rules for seed testing, and illustrations and descriptions of about 90 weeds and weed seeds; and bulletin No. S-7, entitled 'Wild Oats and False Wild Oats, Their Nature and Distinctive Characters.' No. S-7, gives the result of several years work on the question of the identity and characters of certain peculiar forms of apparently wild oats which have been the subject of a great deal of discussion, especially in the prairie provinces.

THE LIVE STOCK BRANCH.

The work undertaken, during the year, in the Live Stock Branch, while following a similar course to that pursued in former years, was carried forward in certain instances along somewhat new and more extended lines. Before referring to the several special features pertaining to the actual work undertaken in the branch, it may be of interest to note, in passing, that public opinion is becoming more and more keenly focussed on the existing situation as regards live stock production throughout the Dominion.

Decreased marketings, firm prices, increased consumption, represent, in concise form, the leading and most significant phases of the live stock trade during the past year. That there is a regrettable lack of development in the breeding and feeding of meat producing animals is impressing itself generally upon the public mind. The fact that this branch of the department has devoted considerable attention to an investigation of the present status of the live stock industry, and, in certain instances, of the conditions attending its indifferent progress, is directing the interest of stockmen generally to a study of present conditions and is emphasizing the need for a forward movement in the production of all classes of live stock on Canadian farms. There is no doubt that the somewhat unfavourable season of 1911 produced unexpected hardships and accentuated the circumstances tending toward decreased production in many parts of the Dominion. It served, however, to concentrate the attention not only of those engaged in agriculture, but also of those following other professions upon the necessity for the further encouragement and development of live stock production in this country. It is evident that there is, amongst farmers as a class, an awakening of interest in the keeping of live stock, and it is believed, therefore, that the present time affords very great opportunities for the undertaking of aggressive measures in the interests of this important industry.

The investigation by Messrs. Dryden and Ritch of the business of sheep raising and of the production and marketing of wool in Canada, Great Britain and United States, which was initiated during the summer of 1910, was completed late in the spring of the following year. The preparation of their report occupied the time of the Commissioners until the month of September, when the commission was disbanded. Mr Ritch's services, however, were retained for a somewhat longer period, in order that an educational campaign, with particular reference to the production, handling and marketing of wool, might be undertaken, prior to the adoption of a more specific policy in the interests of the sheep industry. The advantage of this missionary campaign, as it may be termed, is demonstrated by the success which has attended his meetings in the Maritime provinces and in the Canadian West. It is conceded that, as direct result of the work begun by the Commissioners and continued by Mr. Ritch, there is a revival of interest in the keeping of sheep in many sections of both Eastern and Western Canada, and it would appear that the foundation for future successful work has been well laid, in consequence of the policy which is being pursued by the Department.

The Report of the Commissioners was issued in the month of January and was at once distributed to a very large number of breeders and farmers in the different provinces of the Dominion. The Report reviews in detail the conditions attending the keeping of sheep in Canada, refers to the increased consumptive demand for mutton, points out the possibilities likely to result from a development of the business, and, through its descriptions of sheep raising in Great Britain and United States, illustrates the manner in which greater progress can be brought about in this country. The recommendations with which the Report concludes call attention to definite measures which may be undertaken, with the view of ameliorating existing conditions and of leading to an expansion of sheep raising in Canada.

Steps are now being taken to follow, in part at least, the recommendations included in this report, through the inauguration of a policy having for its object the permanent establishment of the keeping of sheep as an important factor in the agricultural development of the country.

During the summer of 1911, the Department undertook, in accordance with certain clearly defined conditions, to grant assistance to those maintaining Thoroughbred stallions for breeding purposes. In recognition of the value of Thoroughbred blood in improving the light horse stock of the country and in view of the fact that the keeping of Thoroughbred stallions was becoming less and less, under ordinary circumstances, a paying proposition, it was determined to grant such aid to owners of sires of this class as would induce the general and systematic employment of an approved type of Thoroughbred stallion in districts where any interest was manifested in the breeding of horses for saddle and harness use. It has been required that all owners, applying for the grant, should submit their horses to an inspection, as regards soundness and individuality, by an officer of the Department, should stand their horses at a fee, for mare other than Thoroughbred mares, not to exceed $10 to insure, and that there should be furnished, at the close of the service season, sufficient information, pertaining to the number of mares served, &c., to indicate that such season had been in accordance with the conditions imposed by the Department. To the owner of each stallion qualify-

ing therefor a grant of $250 was awarded, and, to the close of the present fiscal year, 36 horses have been awarded the grant.

The number of cows entered for test in the Canadian Record of Performance has continued to increase. A total of 801 were entered during the year ending March 31st, 1912, as compared with a total of 586 entered during the year ending March 31st, 1911. In 1911-12, 160 cows, of the various breeds represented, qualified for entry, under the prescribed regulations, in the official record, while in 1910-11 the total number which qualified in this way was 145. The appointment of additional inspectors has afforded facilities for the rendering of a more efficient and satisfactory service than has hitherto been possible, and, in consequence the work undertaken has grown both in popularity and in utility.

Beginning with the first of January, a new feature was introduced, when the inspectors were required to make weighings, during their visits, of all fodder which was being fed to the cows under test. They were further required to report in detail to the office of the Live Stock Commissioner the cost of the milk being produced and the nutritive composition of the ration, in accordance with a table furnished them, setting forth the prices and the nutritive constituents of the different feeds in ordinary use. An unexpected interest has developed in this new phase of the work undertaken in the interests of those owning and breeding dairy cattle, and, while any statement regarding what is being accomplished would, at the present, be premature, it is believed that this inquiry pertaining to the economy of production will ultimately prove an important adjunct to the Canadian Record of Performance.

After an interval of four years, a Convention of the National Live Stock Association was held in Ottawa, during the month of February, and was attended by men, representative of our varied live stock interests, from all the provinces of the Dominion. Several very important subjects, including Bovine Tuberculosis, Transportation of Live Stock, Interprovincial Trade, and the Present Status of Live Stock Production, were discussed by different speakers, and, based upon the consideration which these subjects received, a number of comprehensive resolutions were drafted and endorsed as defining the views of the members of the association. A full report of the proceedings is being printed, and, when published will be distributed to all persons whose names appear on the mailing list of the Branch. It will also be mailed, upon request, to anyone who may desire to obtain a copy, and, in view of the valuable material which it contains, a careful reading may be unhesitatingly recommended to any desiring to obtain a suggestive resumé of the existing conditions relative to and affecting the live stock trade in the several provinces of the Dominion.

A special officer of the department has been engaged, during the past few months, in making a study of the methods followed in the production and marketing of eggs and poultry by farmers in Ontario and Quebec, and of the manner in which poultry products are handled in the course of their progress from the producer to the consumer. Through this inquiry much valuable information has been secured, and, by it also, the way has been cleared for the undertaking of definite constructive work in the interests of the poultry industry.

A further inspection of French Canadian horses has been arranged for and has, in fact, been commenced. This final examination of stallions and mares, for registra-

tion as foundation stock, is serving to extend the possibilities for development within the breed itself, which it was thought had been retarded by the rather limited number of animals hitherto recorded. It is providing also for the admission of many desirable horses from certain districts where full advantage had not been taken, by the farmers, of the opportunity afforded them of having their horses examined at the time of the previous inspections. It is expected that the work will be concluded early in the summer of the current year.

Considerable assistance has been continued to various provincial organizations in order to further advance the work undertaken by them in the interests of the live stock industry. Of the bodies receiving aid of this nature, there may be mentioned, The Maritime Winter Fair, The Poultry Producers' Association, as also the Boards in control of the Winter Fairs and Stock Sales in the provinces of Manitoba, Alberta and Saskatchewan. As an appropriation to the National Live Stock Records, the Record Board received from the department a substantial grant, and, in addition, the usual assistance as regards the use of office space, stationery and mail and messenger service. Several grants of varying amount, being in the nature of special aid for particular purposes, have also been made during the past year and, it is believed, with compensating returns.

The furnishing of expert judges and lecturers, in response to the requests received from the several provinces, continues to constitute an important feature of the work of the branch. The services of qualified men to act as judges at exhibitions and as lecturers at institute meetings and stock judging schools are in constant demand. The advantages derivable from an interchange of thought and opinion by the stock men of the different sections of the country are now generally recognized and the policy of the department in rendering this possible is evidently receiving general endorsation.

In concluding this summary of what has been undertaken in the Live Stock Branch, during the past year, reference may be made to the bulletins and reports which have been issued. Other than the report of the Sheep Commissioners, previously referred to, the following publications have been printed and widely distributed:—The Annual Report of the Live Stock Commissioner, as it appeared in the report of the Veterinary Director General and Live Stock Commissioner, for the year ending March 31, 1911; Bulletin No. 14, 'Horse Breeding and Rearing of Colts,' by J. G. Rutherford, C.M.G.; Bulletin No. 15, 'Government Assistance to Agriculture in Certain Countries of Europe,' by H. S. Arkell, and Report No. 3, Canadian Record of Performance. The bulletins issued by the branch have been of valuable assistance in replying to the queries of correspondents with reference to various live stock subjects, and the steady demand for copies of the different publications is an evident indication that they are appreciated by farmers and stock men generally.

EXPERIMENTAL FARMS AND STATIONS.

At the close of the fiscal year covered by the present report, the system of Experimental Farms and Stations includes, in addition to the Central Farm at Ottawa, the following branch Farms and Stations, which are given in geographical order from east to west:—Experimental Station, Charlottetown, P.E.I., Experimental Farm, Nappan,

N.S., Experimental Station, Kentville, N.S., Experimental Station, Ste. Anne de la Pocatière, Que., Experimental Station, Cap Rouge, Que, Experimental Farm, Brandon, Man., Experimental Farm, Indian Head, Sask., Experimental Station, Rosthern, Sask., Experimental Station, Scott, Sask., Experimental Station, Lethbridge, Alta., Experimental Station, Lacombe, Alta., Experimental Farm, Agassiz, B.C., Experimental Station, Invermere, B.C., Experimental Station, Sydney, Vancouver Island, B.C., a total of fourteen Farms and Stations. In addition, sub-stations are maintained at Kamloops, B.C., and at Fort Vermilion, on the Peace River, Alta.; experimental work has also been carried on during the year, though no land is owned or rented by the Department, at Athabasca Landing and at Forts Smith, Resolution and Providence, all in northern Alberta.

While much of the work done during the year has been a continuation of the investigations of years past, some of its features have been so elaborated as to be practically new. These are chiefly in connection with the western Farms and Stations where stronger emphasis is being placed on the necessity of diversified farming. The testing of varieties of cereals, fodder corn, roots, clovers and grasses was again carried on, and the annual distribution of seed for the improvement of crops was made, under some new regulations, calculated to make it of more value to the Canadian farmer.

The volume of correspondence has shown that steady increase which has been going on from year to year. Since April, 1911, the following Bulletins have been issued:—No. 69, The Honey Bee, No. 70, Cut-worms and Army Worms, No. 71, The Annual Crop Bulletin, No. 7 (Second Series) The Destructive Insect and Pest Act and Regulations issued thereunder, No. 8, Alfalfa Growing in Alberta, and No. 9, The Control of Insect pests in Canada; the annual Report of the Experimental Farms was also published.

On April 1, 1911, Mr. J. H. Grisdale, B.Agr., formerly Dominion Agriculturist, was appointed to the position of Director, previously held by Dr. Wm. Saunders, C.M.G., whom advancing and consequent poor health compelled to retire.

SOME NOTES ON THE SEASON.

On the Central Experimental Farm, the trial plots of grain gave a yield below the average, owing to the high temperatures and light precipitation during the growing season. The average yield per acre of twenty-one varieties of spring wheat tested was 27 bushels, 7 lbs. per acre. The average yield of 19 varieties of oats was 64 bush. 12 lbs.; of 13 varieties of six-row barley, 49 bush. 32 lbs.; and of two-row barley, 42 bush. and 41 lbs., per acre. Fourteen varieties of peas averaged 21 bush. 15 lbs. From eleven varieties of Indian corn grown for ensilage, the average return was 13 tons, 1,660 lbs. per acre. Turnips averaged 24 tons, 60 lbs. per acre and mangels 22 tons, 1,750 lbs. Of twenty-four varieties of potatoes, the highest yielded 352 bush. and the lowest 132 per acre.

EXPERIMENTAL STATION, CHARLOTTETOWN.

There was very little rain in March and April in Prince Edward Island, but seeding was delayed by cold until the maddle of May. The weather until harvest continued dry, with very high temperatures, which made the yield of hay and cereals only an

average one. Rains late in August and in September helped the yields of Indian corn and roots very materially.

Fourteen varieties of spring wheat averaged 21 bushels 46 lbs. per acre; 25 varieties of oats, 66 bushels 23 lbs. per acre; 12 varieties of six-row barley, 45 bushels 13 lbs.; and 10 varieties of two-row, 43 bushels 31 lbs. per acre . Of peas, twelve varieties tested averaged 44 bushels 49 lbs. per acre. Indian corn grown for ensilage averaged 13 tons, 612 lbs. per acre; turnips, 13 tons, 1,811 lbs., mangels, 33 tons, 1,129 lbs., while 21 varieties of potatoes averaged 236 bushels per acre.

EXPERIMENTAL FARM, NAPPAN, N.S.

The spring weather in Northern Nova Scotia was exceptionally dry and cool, but seeding was finished rather earlier than in the previous year. The early growth of hay was backward. June and the first half of July were hot and dry but rains later resulted in a fair crop of cereals being harvested. During the remainder of the growing season, the rainfall was less than usual and only fair returns of Indian corn, roots and potatoes were obtained, the latter, however, being of excellent quality, as were apples also, although the yield was not large.

Ten varieties of spring wheat tested gave an average yield per acre of 37 bushels 20 lbs.; fifteen varieties of oats, 73 bushel 27 lbs. per acre; eight varieties of six-row barley an average of 45 bushels 40 lbs.; nine varieties of two-row, 47 bushels 24 lbs. Of peas, twelve varieties averaged 26 bushel 20 lbs. per acre. In Indian corn for ensilage, 13 tons, 1,422 lbs. was the average yield per acre of eight varieties. Turnips averaged 36 tons 1,768 lbs., and mangels 38 tons 300 lbs. Of the seventeen varieties of potatoes tested, 379 bushel 56 lbs. was the average return.

EXPERIMENTAL STATION, KENTVILLE, N.S.

This station, about 240 acres in extent, was acquired in 1910 and was almost all in timber or covered with brush. During the past year the work of clearing and breaking was continued and last winter sufficient timber was cut and sawn for the buildings at present required.

EXPERIMENTAL STATIÓN, STE. ANNE, QUE.

The station, also recently acquired, consists of about 126 acres. During the past year it has been put into shape, to a considerable extent, for experimental work, and some material got ready for fencing and erecting the necessary buildings.

EXPERIMENTAL STATION, CAP ROUGE, QUE.

In 1911, the spring opened with very hot weather, as high as 91 degrees being recorded in May. As the rainfall was very light, the ground was very dry at seeding time, which began about May 15. Both the summer and autumn months were favourable for growth and very good crops were harvested.

Ten varieties of spring wheat gave an average yield of 27 bushel 49 lbs. per acre. Of oats, eleven varieties averaged 75 bushels, 13 lbs. Six-row barley, with seven

varieties, averaged 25 bushels 24 lbs., and two-row, with six varieties, 35 bushels 22 lbs. per acre. In peas, ten varieties averaged 28 bushels 36 lbs. Turnips averaged 22 tons 1,905 lbs., and mangels 5 tons, 1,478 lbs. The yield of the latter was affected by being sown on an area unsuited to the conditions of the season. The Indian corn, on similar lands, was ploughed under. In potatoes, 27 strains, of sixteen varieties, were sown, one object being to test strains of the same variety, brought from different parts of the country. Marked variations in yield were recorded, the average crop being 77 bushels 8 lbs. per acre.

EXPERIMENTAL FARM, BRANDON, MAN.

Seeding in 1911 began rather late in the Brandon district, about April 20. Until the middle of July, the season was rather dry and the grain crops suffered; from then on, rainfall was abundant. As a result, the yields of grain were below the average, both in yield and quality, while the returns of roots and potatoes were unusually good. Harvesting began on July 31, but was delayed, as was also threshing, by bad weather. No injury was experienced from frost, the first severe one being on September 25.

Of the eight varieties of spring wheat tested, the average yield was 41 bushels 35 lbs. per acre. Seventeen varieties of oats averaged 84 bushels 20 lbs. per acre. The six-row varieties of barley, eleven of which were tried, averaged 62 bushels 8 lbs., and seven varieties of the two-row averaged 57 bushels 3 lbs. per acre. Of the thirteen varieties of peas tested, the average yield was 47 bushels 54 lbs. per acre. Nine varieties of Indian corn were grown for ensilage, averaging 21 tons, 1,791 lbs. per acre. Turnips gave an average return of 27 tons 230 lbs., and mangels 29 tons 1,914 lbs. per acre. Thirty varieties of potatoes were tested, the highest yield being 777 bushels, and the lowest 275 bushels per acre.

EXPERIMENTAL FARM, INDIAN HEAD, SASK.

The weather during the early part of April was cold and backward, but became warmer by the middle of the month and seeding was general by the 20th. Ample rainfall during May and June caused rapid growth, but the rain continued through July and August, and frost on the 25th and 27 of the latter month injured the grain not in stook. Harvesting, which started on August 15 with barley, and on the 18th with Marquis wheat, and threshing operations later on, were both delayed by the heavy straw and wet weather. The yields were heavy, however, and roots and potatoes, which were harvested without injury, gave the heaviest yields ever obtained on the Experimental Farm.

Nine varieties of spring wheat averaged 39 bushels 29 lbs. per acre. Of oats, fifteen varieties averaged 127 bushels. 16 lbs. per acre. Eleven varieties of six-row barley gave 84 bushels 30 lbs. per acre, and eight of two-row yielded 74 bushels 5 lbs.

Although the yield of peas was reduced by frost, 12 varieties gave an average yield of 37 bushels 8 lbs. per acre. Nine varieties of Indian corn grown for ensilage gave an average return of 20 tons, 1,800 lbs. Turnips gave an average of 34 tons, 102 lbs. per acre, and mangels one of 31 tons, 235 lbs. Seventeen varieties of potatoes averaged 649 bushels, 43 lbs. per acre.

EXPERIMENTAL STATION FOR NORTHERN SASKATCHEWAN.

ROSTHERN, SASK.

Seeding in this district was from two to three weeks later than in 1910, beginning about April 15. The rainfall, although not heavy, was well distributed throughout the earlier part of the season and all field crops gave good returns. Cool and wet weather delayed maturing and harvesting and there was some injury from frost as a result.

Ten varieties of spring wheat gave an average yield of 63 bushels per acre and fifteen of oats gave one of 119 bushels 15 lbs. per acre. Of nine varieties of six-row barley, the average yield per acre was 79 bushels 12 lbs. and 6 sorts of two-row averaged 77 bushels 28 lbs. In Indian corn for ensilage, seven varieties gave an average return of 9 tons, 1,786 lbs. per acre. Turnips averaged 21 tons, 517 lbs. per acre and mangels 20 tons, 392 lbs. Seventeen varieties of potatoes were tested, the highest yield being 585 bushels, 12 lbs. and the lowest 193 bushels 36 lbs. per acre.

EXPERIMENTAL STATION FOR NORTHWESTERN SASKATCHEWAN.

SCOTT, SASK.

On this station, but recently put into operation, complete experimental work was not attempted during 1911, the season being devoted mainly to preparation and to the growing of field crops. Up to August 19, the weather was most favourable for growth, when a severe hailstorm destroyed much of the crops on the Station and parts of the surrounding district, greatly injuring the remainder. The harvest weather also was unfavourable, rain and frost doing some damage.

EXPERIMENTAL STATION FOR SOUTHERN ALBERTA.

LETHBRIDGE, ALTA.

As stated in previous reports, experimental work in the growing of crops is carried on under both irrigated and non-irrigated conditions.

The spring of 1911 opened early and fall wheat appeared to have wintered well. Seeding began early in April and crops came on rapidly until dry weather set in during the latter part of May and early June which prematurely ripened the winter wheat, the yield of which was light. Rain in the latter part of June brought the other crops along well. On August 15, the grain on a large part of the Station was damaged or destroyed by a severe hailstorm, all of the grain on the non-irrigated part being destroyed and that on the irrigated reduced some 20 to 25 per cent. Wheat already cut was badly threshed out. Root crops and potatoes also suffered greatly.

On non-irrigated land, winter wheat averaged 32 bushels 6 lbs. twelve varieties being tested. Spring wheat, oats and barley were destroyed by hail. Twelve varieties of peas gave an average yield of 22 bushels 32 lbs. per acre. Seven varieties of Indian corn for ensilage gave an average of 16 tons 1,629 lbs. per acre. Ten varieties of

turnips averaged 14 tons, 1,947 lbs. and 8 varieties of mangels, 15 tons 1,336 lbs. per acre. Of eighteen varieties of potatoes tested, the highest yielded 396 bushels and the lowest 222 bushels 12 lbs. per acre.

On the irrigated land, five varieties of spring wheat gave an average of 52 bushels 9 lbs. per acre and 5 sorts of oats one of 84 bush. 12 lbs. Six-row barley, with six varieties, gave an average of 62 bushels 11 lbs and 4 varieties of two-row averaged 59 bushels 18 lbs. per acre. Twelve sorts of peas averaged 39 bushels 24 lbs. per acre. Indian corn for ensilage, seven varieties of which were grown, averaged 16 tons, 366 lbs. per acre. Turnips averaged 22 tons, 892 lbs. per acre and mangels 20 tons, 731 lbs. Eighteen varieties of potatoes were tested, the highest yield being 546 bushels 40 lbs. and the lowest 223 bushels 20 lbs.

EXPERIMENTAL STATION FOR CENTRAL ALBERTA.

LACOMBE, ALTA.

The season of 1911 at Lacombe opened rather late and was remarkable throughout for its heavy rains, the total rainfall for the six months from April 1 being 17.8 inches. One heavy storm, on June 21, partially washed out some of the grain plots and almost destroyed the root crop.

Nine varieties of winter wheat gave an average of 41 bushels 6 lbs. per acre, and eleven of spring wheat 36 bushels 8 lbs. per acre. Twenty-one varieties of oats gave the high yield of 106 bushels 7 lbs. per acre. Eleven sorts of six-row barley averaged 79 bushels 26 lbs. per acre, and thirteen varieties of two-row, 60 bushels 42 lbs. per acre. The results with peas were disappointing, the average of thirteen varieties being only 8 bushels. Indian corn also did poorly, owing to the wet, cool season, seven varieties averaging 3 tons 1,592 lbs. per acre. As above stated, the yields of turnips and mangels were very small. Twenty-two kinds of potatoes were tested, the largest yield being 269 bushels 30 lbs., and the lowest, 41 bushels 15 lbs.

EXPERIMENTAL FARM AT AGASSIZ, B.C.

In this district of British Columbia, the weather during April was, on the whole, quite favourable, although growth was not rapid. The early part of June was wet and cold, but, being followed by dry, warm weather, field crops gave fairly good returns and were harvested in excellent condition.

Ten varieties of spring wheat tested, averaged 21 bushels 30 lbs. per acre. Of the fifteen varieties of oats tested, the average yield was 52 bushels 27 lbs. Ten varieties of six-row barley averaged 31 bushels 15 lbs., and eight of two-row 36 bushels 1 lb. per acre. Of field peas, twelve varieties averaged 25 bushels 40 lbs. per acre. The average yield of nine varieties of Indian corn grown for ensilage was 16 tons 1,373 lbs. per acre. Turnips returned an average of 13 tons 1,364 lbs., and mangles 14 tons 875 lbs. In the sixteen varieties of potatoes tested, the highest yield was 457 bushels 36 lbs., and the lowest 134 bushels 12 lbs.

EXPERIMENTAL STATION, INVERMERE, B.C.

This station, purchased last year, consists of some fifty-two acres, and is to serve mainly as an experimental fruit station. This work will be conducted under irrigation. The land has been cleared and most of it broken this year.

EXPERIMENTAL STATION, SYDNEY, B.C.

This station is located on Vancouver Island, and is about 135 acres in area. To a great extent it is covered with heavy timber, and clearing operations have not yet been commenced.

SUBSTATIONS.

At Kamloops, B.C., where some operations under 'dry-farming' conditions are being carried on the season was a very unfavourable one, owing to the almost complete lack of precipitation during the winter of 1910-11. The work is carried on on the 'Harper Ranch,' where ten acres is rented for the purpose.

At Fort Vermilion, on the Peace River, land is rented for experimental work on the farm of Mr. Robt. Jones, who carries on the work for the department. Excellent results were obtained last season with cereals and some of the hardier vegetables, although there was considerable damage from frost.

AGRICULTURAL AND LIVE STOCK DIVISIONS.

FIELD CULTURAL WORK.

The comparative tests of different rotations, the first of which were inaugurated thirteen years ago, have been continued and in part completed. The results of these tests indicate clearly the superiority of the relatively short rotation as a soil cleanser and a profit producer.

For intensive dairy farming, a three-year rotation, namely: First year, corn or roots; 2nd year grain, seeded down clover, timothy and alfalfa; 3rd year, hay; has so commended itself that it is proposed this year to put down the greater part of the '200-acre farm' to this rotation.

Further studies have been made regarding the economy of using large-size implements, and the results accord with our findings of previous years. Where it is at all practicable, there is no doubt but that a considerable saving in money can be made by the use of larger implements than now find general favour among our farmers.

LIVE STOCK.

Horses are used for working purposes only, no breeding whatever being done.

Beef cattle work is now limited to the feeding of steers, the herd of dual purpose Shorthorns having been transferred to our Experimental Farm at Brandon.

Dairy cattle are receiving increased attention. Holsteins and Jerseys have been placed in the stables so that there are now representatives of five breeds, namely: Holsteins, Ayrshires, Guernseys, Jerseys and French-Canadians.

Sheep are not kept in large numbers because of the limited pasture area available. Shropshires and Leicesters, representing respectively the short and long wool types of sheep, make up the flock. In addition to the breeding of pure-bred animals experimental work in the fattening of wethers has been carried on with instructive and profitable results.

Swine raising has proven one of the best paying branches of the live stock work. Yorkshires, Tamworths and Berkshires are kept, with which breeding and feeding experiments are carried on. Many pure-bred animals are annually sold for a moderate price, and the increasing demand for such stock indicates the efforts that are being taken by farmers to improve their breeding herds.

HORTICULTURAL DIVISION.

The Dominion Horticulturist, Mr. W. T. Macoun, who has charge of the Horticultural Division, has been able during the past year to render valuable assistance to the Superintendents of the Branch Experimental Farms and Experimental Stations, in suggesting new experimental work and in better systematizing the work which has been in progress. By visiting the Branch Farms, the Dominion Horticulturist conferred personally with the Superintendents and was thus brought into close touch with their work. On the newer farms, where little or no planting had been done, he assisted in planning and planting the orchards and ornamental grounds; as for instance at the Experimental Station at Scott, Sask., on the open prairie where there were no trees growing naturally, he assisted in planting the first apples, plums, bush fruits, strawberries, and ornamental shrubs set out. At Rosthern, Sask., and Lacombe, Alta., also, planning and planting were done. At the Experimental Station, Cap Rouge, Que., where the first planting was done in 1911, he assisted in laying out the orchards and other plantations. At the Experimental Station at Kentville, N.S., he suggested the area to be devoted to Horticultural work and ordered the fruit trees required for the land to be planted in 1912. He also had apple seed of the best winter varieties sown there in the autumn of 1911, looking to the growing of new varieties which, it is hoped, will prove useful in Nova Scotia. At the other Branch Farms and Stations he was able to aid the Superintendents in many ways. The Dominion Horticulturist orders most of the material, such as trees, shrubs, herbaceous plants and seeds required for the Branch Farms and Stations, and by a card index system at the Central Farm, is able to tell what is growing and what is needed at any of these Farms.

At the Central Experimental Farm, where his headquarters are, most of the experiments of previous years were continued in 1911-12 and additional experiments and new work started. One of the experiments in progress is the originating of new varieties of fruits which will prove useful over a wider range in Canada than those already available; at the same time better varieties are sought for the districts where the varieties now considered best are already grown. During the past eight years, practically 1,000 new varieties originated at the Central Experimental Farm have fruited there, of which 276 fruited for the first time in 1911. Many of these have proved very promising and over 60 of the best have been named and will be more thoroughly tested and compared with those already on the market. The work of originating new varieties for the Canadian Northwest begun by Dr. Wm. Saunders

is now included in the Horticultural Division. A number of the second crosses fruited in 1911, some of which are quite promising and are being propagated for test as to their hardiness in the prairie provinces. A large number of seedlings of the hardiest Russian apples was raised at Ottawa in 1911, and these are being sent to the prairie Farms to have their trunks developed, if possible, in that climate, in the hope of obtaining hardy varieties of large apples by this means.

Considerable attention is also being paid to the improvement of the Native and American plums, and some excellent new varieties fruited in 1911.

New and chance seedling fruits of different kinds are sent to the Horticulturist every year by persons on whose places they originated, and some very promising new things are being brought together and tested by this means.

In addition to the origination and testing of new varieties in the ways described, the newer sorts offered for sale by nurserymen are tested each year and compared with other sorts.

At the Central Experimental Farm, the dates of blooming of the different varieties of fruits have been recorded since 1895, and, as the importance of planting and mixing varieties which bloom at the same time in the orchards and other fruit plantations is now fully recognized, these records are proving more valuable every year. There was a number of inquiries for information in this direction in 1911.

The yield of each individual tree in the orchard has been recorded since 1898, and the information now available is very valuable as showing the variation in yield of different trees and how much a tree of a given variety might be expected to bear at any year after setting out. The blooming records and records of yields have, we believe, been kept for a longer continuous period here than at any other institution.

Believing that it is of the greatest importance to enable the farmers and market gardeners of Canada to obtain the very earliest strains of vegetables, the development of new and earlier strains by selection has been continued for several years. The vegetables longest selected are tomatoes, beans, corn, peas and melons, and the strains now developed of the three first are very early. The quantity of these is being increased so that they may be tested by a considerable number of growers, and eventually it is hoped they will take the place of later strains. It has been arranged to continue the work with these and other kinds of vegetables.

More attention was paid to the ornamental grounds at the Central Farm in 1911 than usual. A new border about 450 feet long extending across the northern end of the large lawn has been planted with the best perennials. A new rose garden was planted, and many new varieties were added both to the roses and to the herbaceous plants. In view of the great importance of doing as much as possible to encourage the beautifying of farmers' homes in Canada, and of having information available for those making a business of selling ornamental plants, it is hoped to make the ornamental grounds at the Central Farm, even more than it has been in the past, a source of information to those interested in the appearance, habits and relative availability of ornamental plants.

By attending meetings and giving addresses, and by means of correspondence, which has about doubled in the Horticultural Division during the past year, the Dominion Horticulturist has been also able to render much service to those interested in horticulture in Canada.

CEREAL DIVISION.

The past season was unfavourable for cereals in many parts of Canada owing to heavy rains and cool weather in some districts and excessive heat in others. Some of the experimental farms and stations suffered rather severely, and the work of the cereal breeding, testing and propagating (carried on chiefly at Ottawa, but in the later stages at the other farms also), did not make as good progress as usual. The unfavourable conditions were by no means an unmixed evil, for they served a good purpose in bringing out clearly the superiority of some of the new varieties of grain which have been bred on the experimental farms.

MARQUIS WHEAT.

Marquis wheat, which has attracted so much attention in recent years, as an early-maturing, prolific, disease-resisting variety, achieved a veritable triumph last season, especially in the province of Saskatchewan, where it surpassed the old standard variety, Red Fife, in strength of straw, earliness, yield and quality on almost every farm where it was grown.

The winning of the highest award for wheat in New York city last autumn by an exhibit of Marquis grown at Rosthern, has drawn additional attention to the merits of this variety. This success was all the more noteworthy in view of the unfavourable character of the season.

At the Indian Head experimental farm, Marquis wheat has now been grown for five years. During that period it has given an average yield of the test plots of 50 per cent more than that obtained from Red Fife, besides being of superior quality in unfavourable seasons. While this enormous difference may not be maintained in a longer test, since the five year period began and ended with a very cool season (disadvantageous to Red Fife), there can be no doubt of the much greater productiveness of Marquis. This is due partly to earliness in ripening by which it escapes some of the early frosts and partly to its less susceptibility to rust than Red Fife. In strength of straw it also shows distinct superiority in districts where long straw and consequent lodging are common.

Marquis is now generally admitted to be the best variety of wheat for almost all Saskatchewan, for Central and Northern Manitoba and for large areas in Alberta. Its value to these Provinces can scarcely be estimated. The demand for seed is far beyond the supply and nearly all the available stock was sold at good prices before the middle of the past winter. No exact figures are available as to the total acreage of Marquis grown last year, but there is every indication that it will be the chief variety in Saskatchewan in the course of a very few seasons. This shows the rapid progress which it has made when it is remembered that the original plant from which Marquis is descended was discovered in the year 1903 (at Ottawa).

OTHER NEW VARIETIES OF GRAIN.

The Dominion Cerealist is now engaged in propagating for distribution an extremely early-ripening variety of wheat to which the name "Prelude" has been given. This wheat has been tested in Manitoba and Saskatchewan as well as at

Ottawa. It ripens about two weeks before Marquis, in Saskatchewan, and has shorter straw. It has red kernels of unusually high weight per bushel and yields flour of excellent bread-making strength, though not equal in colour to Marquis or Red Fife. Prelude is not intended to supplant Marquis. It cannot be expected to give so large a crop. But is is likely to prove of very high value for those districts where Marquis cannot be depended upon to ripen before frost. Prelude is a cross-bred variety of rather complex pedigree and was bred at Ottawa by the Dominion Cerealist.

The Arthur pea has again demonstrated its splendid crop-producing power in almost all districts. Its decided earliness gives it a distinct advantage over other sorts. Arrangements have been made to grow a considerable quantity of this valuable field pea for distribution and sale next year.

The new selected Manchurian barley is also giving much satisfaction, and is evidently an introduction of great value.

BUILDING FOR THE CEREAL DIVISION WORK AT OTTAWA.

The obvious need of a proper building for the cereal work, including the seed distribution, at Ottawa has been provided for during the past year. The new building contains a granary, threshing room, grain cleaning and bagging rooms, writing room, milling room, &c. An electric motor has been installed for power, and improved grain cleaning machinery has been purchased. Much better work is now possible under the improved conditions.

SEED DISTRIBUTION.

Further efforts have been made to increase the efficiency of the seed distribution both by the adoption and enforcement of more rigid regulations and by the raising of the standard of the seed sent out, the object in view being to furnish seed of the best varieties and of the highest quality to as large a number of careful farmers as possible. It is of course impossible to provide unlimited quantities of the very best seeds, and some restrictions are therefore essential as to the manner in which the distribution is conducted. While the new regulations have not been put in force without objections from some quarters, there is no doubt that they meet with the hearty approval of the most careful and thoughtful farmers. It is believed that the value to Canada of the seed distribution is being very materially increased by the measures which have been adopted.

BREEDING AND SELECTION OF CEREALS.

This branch of the work of the Cereal Division, which is of fundamental importance, is being continued; though a larger portion of time than formerly is now devoted to the propagation of new varieties at the various experimental farms and the study of their suitability for the various climates of Canada.

Some hundreds of new cross-bred kinds of wheat, oats, barley and peas are undergoing preliminary tests at Ottawa. These include some varieties of great promise which will be tested as soon as practicable in the various localities for which they are

intended. Breeding and selection are also being carried on with beans and flax. The latter promises to be a particularly productive branch of the work, in view of the large acreage devoted to flax in Canada.

DIVISION OF CHEMISTRY.

Since the science of chemistry furnishes much of the foundation upon which the practices of modern farming rest, it follows that with the spread of information in agricultural matters the work of this division increases in scope and influence. As heretofore, this work has been conducted with the view of rendering direct assistance to the farmer in his every day work, and in the endeavour to solve some of the many agricultural problems which call for the aid of chemistry and which are of more or less interest throughout the Dominion. The chief channel through which the farmer is directly helped is correspondence, a feature of the work that increases in importance as the years go by. Inquiries relating to soils, manures, fertilizers, feeding stuffs, spraying materials, &c., &c., are daily received and in the answering of them the division undoubtedly does a valuable educational work. Accompanying these letters many samples of an agricultural nature are sent in for examination. The complete analysis of all such samples would be impossible, and in many cases quite unnecessary —but as opportunity permits they are submitted to such an analysis as the occasion warrants and a report furnished as to their value and uses.

Of the investigations studied during the past year, some of the more important may be briefly discussed, as follows:—

CANADIAN SOILS.

In continuing the work on Canadian soils there has been examined a series from the district of the Lower Saskatchewan river (The Pas), collected by Wm. Ogilvie, Esq., D.L.S. The data obtained show that the area involved (between 2,000,000 and 3,000,000 acres), is one that has considerable agricultural possibilities and that with effective drainage much soil of excellent quality, suitable for farm crops in general, would result.

A large number of soils from the district of the Southwest Miramichi River, New Brunswick, have been examined and reported on. From the chemical and physical determiantions it would seem that the district represented is more suited to forestry than to general agriculture.

Soils from virgin or unoccupied areas in Nova Scotia, Manitoba, Saskatchewan, Alberta and British Columbia, have also been analysed. The data obtained have added considerably to our knowledge of the native soils of these provinces and have proved of value in advising those who had settled upon these lands in the matter of their rational treatment and up-keep.

CONSERVATION OF SOIL MOISTURE.

Of the various factors that must be considered in any discussion of soil fertility, none is of greater importance than soil moisture. Without an adequate supply of

water during the growing season the crop cannot attain its maximum growth, no matter how rich the soil may be. Drought more frequently than lack of plant food, limits the yield. The significance of learning the best means of conserving moisture within the soil will therefore be obvious, especially for districts subject to seasons of scanty rainfall. The influence of certain cultural methods and systems of rotations on the soil's moisture content is a subject of particular interest to western farmers, and one that for many years has received attention and study from this division. During the past season the work has been continued and extended, the areas devoted to the various experiments in cultural operations on the Experimental Farm at Brandon, Indian Head, Rosthern and Lethbridge, affording a new and enlarged opportunity for obtaining useful data. Periodic determinations have been made of the moisture in the soils of the plots devoted to the experiment in prairie breaking, depth of ploughing, summer-fallowing, green manuring and the use of soil packers. This work must be continued for a number of years, to eliminate the effect of seasonal variations, and to ascertain the influence of different rotations, so that final reporting upon these results will be deferred. It may be stated, however, that despite the fact that the past season at many of the points of experiments has not been such as to furnish any outstanding results, the data do show that the moisture content of a soil may be distinctly modified by the nature of the culture and that surface cultivation is a most valuable means towards moisture conservation. A large number of experiments in 'depths of ploughing' and in 'packing' were made, but as yet the evidence is inconclusive as to a general practice that would be the most effective as regards the conservation of moisture in the soil; probably the nature or texture of the soil will be found to largely modify the culture necessary to that end.

NATURALLY-OCCURRING FERTILIZERS.

In various parts of the Dominion materials occur that can be used to advantage in the improvement of soils. These include marls, gypsum, swamp muck, peat, tidal deposits, sea-weed and other naturally-occurring substances possessing fertilizing value. Additional information has been gained during the past year respecting many of these substances, as occurring more particularly in the Maritime provinces and Quebec.

FODDERS AND FEEDING STUFFS.

Further analyses have been made of early and late cut hays. The examination of certain samples from Northern Alberta show that hay cut from grass before the rainy season and cured without rain or frost proved vastly superior to that cut later in the season and after rain and frost.

Samples of ensilage from Indian corn and from wood pea, from La Trappe, Quebec, were compared, with the results that the latter was found twice as rich in albuminoid substances as the former, and hence of greater feeding value. Clover ensilage from a crop cut in the early blossoming stage at Agassiz has also been analysed, establishing its high nutritive qualities for stock feeding.

Three varieties of broom corn grown on the Central Farm have been analysed at two stages of growth. Compared with the fodder of Indian corn, this material is

distinctly inferior in containing less protein and more fibre. It would also appear from United States authorities to be less palatable and digestible than corn fodder, so that its growth simply as a forage crop could not be recommended, though as a by-product in the production of broom-making material, its nutritive value might be taken advantage of. That cut at the earlier stages was the more nutritious.

In order to furnish information to inquiring farmers and stock feeders, a number of cattle feeds—chiefly milling and factory by-products—have been examined and reported upon.

THE COMPOSITION OF WHEAT AS INFLUENCED BY SOIL AND CLIMATIC CONDITIONS.

This research was commenced several years ago, and a considerable amount of evidence has accumulated to show that the protein content of wheat of the same variety and parentage may fluctuate from year to year, according to the character of the season. From past work it would seem that conditions that lead to the rapid development of the grain tend to the formation of a high protein kernel. The excellent quality of Northwestern wheat as a class is due no doubt very largely to the fact that the climatic conditions generally prevailing in those parts are conducive to a comparative short season of growth with the rapid development and maturation of the grain.

During the season of 1911 wheat of the same stock has been grown on twelve of the Experimental Farms and Stations and the harvested grain compared, by analysis, with the parent seed.

INSECTICIDES AND FUNGICIDES.

From time to time new spraying preparations are put upon the market under proprietary names and, in accordance with the practice of the division, an effort has been made to examine such materials as they appeared with a view of determining their nature and probable value.

THE WHOLESOMENESS OF FROZEN ROOTS.

The statement having appeared in certain agricultural papers that frozen roots were poisonous to stock, an experiment was inaugurated to ascertain the correctness of the assertion. Without entering into details it may suffice to say that in a trial with swine, which lasted four weeks, frozen mangels and mangels which had been repeatedly frozen and thawed were fed with an equal quantity of meal (the animals receiving all they would eat of the mixture) and though in some of the pens the pigs made little or no gain, no impairment of health was observed.

WELL WATERS.

As in the past analyses of farmers' well waters have been made and reports in detail respecting the wholesomeness of the supply sent to those forwarding the samples. This branch of the work is directly helpful to the farming community and no doubt has effected an influence for good in respect to the very important matter of a pure water supply in rural homes.

RAIN AND SNOW.

The determination of the nitrogen compounds of rain and snow was begun in the winter of 1906-07 and has been continued without interruption since that time. It would appear that from this source the land may receive annually, per acre, about 5 lbs. of nitrogen in forms that would be directly available for crop growth.

DIVISION OF ENTOMOLOGY.

The work of this Division has comprised: The administration of the Destructive Insect and Pest Act and of an appropriation for the care of orchards on the Indian Reservations in British Columbia, the answering of inquiries and the giving of advice concerning insects affecting farm, garden and orchard crops, forest and shade trees, live stock, household and public health; the naming of collections of insects for individuals and schools, and the carrying on of investigations upon the life histories of insects and their bionomics in relation to the problems of insect control.

Under the Destructive Insect and Pest Act, measures were taken to prevent the introduction of insects into Canada in imported trees, plants or other vegetation, and to control the spread of the Brown-tail moth in Nova Scotia and New Brunswick. In addition to fumigating a large amount of imported nursery stock, over four million trees and plants imported from Europe, Japan and the New England States were inspected for the Brown-tail and Gipsy moths, specimens of both insects being found. With the co-operation of the provincial Departments of Agriculture of Nova Scotia and New Brunswick, these provinces were scouted for the nests of the Brown-tail moth. The conditions in Nova Scotia are about the same, although the infestations in certain localities were more serious; nests were found in Kings, Annapolis, Digby and Yarmouth counties. In March, 1911, the first nests were found in Charlotte County, N.B.; this season's inspection, however, up to the time of writing, has disclosed a widespread infestation in New Brunswick; over two thousand nests have been found spread over the southern portion of the province in the counties of Charlotte, York, Sunbury, Queens, Kings, and St. John. While every effort is being taken by the destruction of the winter nests to check the increase of the insect, it will be impossible to control it except by aiding and increasing the natural means of control, that is, by the introduction of the parasitic enemies of the insects. This method is being adopted on a very large scale by the United States Department of Agriculture in the New Englanad States with considerable promise of success. A beginning was made during the last summer, and, by the courtesy and co-operation of the Entomologist of the United States Department of Agriculture, with whom my officer in charge of the Division of Entomology conferred, a few parasites were imported into New Brunswick. It is hoped to carry on this work on a large scale during the coming season.

The common fruit pests have occurred in their usual abundance. Injuries to fruit by the Curculio beetles and Capsid bugs appear to be increasing and arrangements are being made to investigate these insects and their means of control. In certain districts of Quebec and Ontario, New Brunswick and British Columbia, Tent

Caterpillars were exceptionally abundant and destructive, stripping both fruit and forest trees. The Palmer Worm was reported in Ontario. Satisfactory progress has been made in the work of supervising and cleansing the Indian orchards in British Columbia on behalf of the Department of Indian Affairs.

In certain parts of Southern Alberta cutworms were very destructive especially to wheat and the total acreage ruined by them was considerable. Owing to the increase of "Silver top" in oats caused by Thrips, a minute species of insect, a study is being made of its injuries and habits; by causing sterile ears, this insect when it is abundant reduces the yield very materially. The Chinch bug was reported in Ontario and in the western part of the province, where the injuries of the White Grubs have been severe during the last few years. Swarms of the adult insects, the June Bugs, appeared and defoliated fruit and other trees.

The Potato beetle is the most commonly reported, and certainly in the aggregate the most injurious insect, affecting root crops. Experiments on the prevention and control of root-maggots were continued and the superiority of the tarred felt paper discs over other methods of protection was again demonstrated.

The investigations on the Spruce Budworm and its parasitic means of control were continued in conjunction with field observations. Material was collected from different regions in Quebec and British Columbia and the result of the season's work were sufficient to indicate that the pest would be controlled by its natural parasites, which were extremely abundant in certain localities, before the trees had been seriously injured. The westward spread of the Larch Sawfly was more serious and the importation of parasites from England was commenced. With a view to obtaining a large quantity of parasitic material the Dominion Entomologist visited the localities in England where this pest is being controlled and arranged for the collection and shipment of parasites. In view of the serious depredations which forest insects, particularly bark beetles, are causing in the forests in the various regions of Canada, an assistant entomologist has been appointed to devote his entire time to the study of insects affecting forest trees.

Inquiries are being made in reference to certain insects affecting live stock such as Ticks and Sheep Maggots. The collections of insects in the Division are gradually being arranged and determined and are proving increasingly useful.

More attention is being devoted to apiculture. Much gratification is being shown by beekeepers and others with the activity of the Division in regard to this somewhat neglected but important branch of agriculture.

Visits were paid by the Dominion Entomologist to New Brunswick and Nova Scotia in connection with the Brown-tail moth campaign. A visit was also made in April to Washington, D.C., and Melrose Highlands, Mass., for the purpose of studying the methods of the Bureau of Entomology of the United States Department of Agriculture. In December and January the Dominion Entomologist spent five weeks in England during which time conferences were held at the Colonial Office and the Board of Agriculture on matters relating to the prevention of the introduction of insect pests into Canada. The Division of Entomology has arranged exhibitions at Toronto and Ottawa and the Dominion Entomologist has delivered addresses on many occasions on insect pests and their control.

DIVISION OF BOTANY.

The sphere of work of this division has been enlarged during the year and comprises at present:

1. The identification of weeds and poisonous plants and their methods of eradication.

2. The conservation of the Herbarium and other scientific collections.

3. The control and management of the botanic garden and arboretum.

4. The trials of new crop plants like broom corn, &c.

5. The investigation and control of plant diseases.

By means of short articles in the press, the publication of bulletins, by lectures and attendance at conventions, by personal interviews, and by a large and extensive correspondence, it is sought to disseminate widely any useful information concerning the results of the work of this division. Another factor of importance is the opportunity placed at the disposal of the staff of this division to become familiar with the various conditions existing in the different provinces and districts of the Dominion. Attention is being paid, primarily, to the special requirements of farmers and fruit growers as far as these concern the work of the division.

Nearly 1,000 different plants were received from all over the Dominion for identification and advice regarding their useful or objectionable properties. Much interest has been taken in the experiment of growing wild rice (*ziania aquatica L.*) Many farmers and owners of land having suitable spots for the growth of this plant have made application for seed. It is claimed that the plant affords a good protection for water fowl, providing shelter and food, besides aiding in protecting the shores of lakes and ponds. The successful raising of seed, and the solution of the problem of preserving its power of germination would result in an additional source of income to many farmers. The seed is much asked for from England.

Considerable attention is being given to the poisonous properties of a common weed of damp and moist land, i.e., horsetail (*equisetum sp.*) Several species of this weed are found in the Dominion. They have long been known to be injurious to the health of animals, especially horses; in some instances deaths have been reported which could have been due only to the consumption of this weed. It has been found present to a considerable extent in various samples of hay received for analysis. In every case, the sender complained of a peculiar injury to his horses, and the fact that this weed was found present in more or less large quantity in the hay given to the animals speaks for itself. In one instance, from British Columbia, such 'hay' was composed of 64 per cent horsetail.

A considerable number of plants were added to the herbarium of the division. They were collected locally as well as on various trips to different parts of the country. A careful collection has been made of plants growing wild on Sable Island, among which were several hitherto unrecorded from that locality.

The collection of microscopic fungi, particularly those causing diseases in plants and others of more scientific interest, was considerably increased. These collections are very useful in the study of plants and fungi in regard to their relationship, association and economic value or importance.

The Botanic Gardens and Arboretum have been placed under the control and management of the Dominion Botanist, partly to relieve the increased responsibilities of the Dominion Horticulturist, and partly because they were thought to come more properly within the province of the former.

In connection with this work, involving several problems of economic importance, the Dominion Botanist was instructed to proceed to Sable Island, and to make inquiries as to the possible introduction of vegetation, and to continue the work begun some twelve years ago by Dr. William Saunders.

The island, which is merely a sandbank, and, as such, a menace to navigation—being popularly known as the Graveyard of the Atlantic—needs very urgently some protection by suitable vegetation. Owing to its very exposed situation, practically all of the 80,000 trees and shrubs planted twelve years ago have been destroyed by wind and the grinding powers of the drifting sand. It is thought that any aid that can be given to preserve the island will depend upon the conservation and propagation of plants growing there naturally.

In view of the fact that Canada imports annually broom corn and mnaufactured brooms to the value of about $400,000, the Dominion Botanist has paid considerable attention to the possibility of growing this crop in some localities in Canada suitable for the purpose. It is hoped from this year's experiments, which will be continued, that some variety may be found that may be useful for cultivation in certain regions. In Ottawa, the broom corn raised was nearly 12 feet high and bore brushes of considerable length, though by no means up to the standard of such corn as grown in the United States.

One of the most important phases in the work of the division is connected with the investigation of the diseases affecting the various agricultural, fruit, and vegetable crops, and forest trees. Amongst the diseases which have received attention during the past year, the following are deserving of special mention:—

Silver Leaf Disease.—This attacks a considerable number of fruit trees being, perhaps, most frequently found on apple and plum trees. Although well known in Europe it has not been reported as occurring on this continent until noticed by the Dominion Botanist in Nova Scotia in 1909, since which time it has been observed in many places in the Dominion from Nova Scotia to British Columbia, and also in widely separated localities in the United States. While the disease has not been known to occasion widespread epidemics, as is the case with some others, it is nevertheless serious since an attacked tree almost always succumbs. An article dealing with the symptoms and treatment of the disease was prepared and published in most of the horticultural journals of the Dominion, in order to put the fruit growers on their guard against it.

Phoma Disease of Turnips.—In January, 1912, a correspondent in Prince Edward Island reported that the turnip crop in certain portions of the province had been seriously affected by some disease. A specimen of an attacked root being also submitted for examination, it was found to be infected by the fungus *Phoma napobrassicae Rost.* The disease has apparently not been previously reported from Canada or the United States, but is known in several European countries and elsewhere. In

New Zealand, for example, it is a very serious enemy of the turnip crop, and its introduction into this country is certainly very unfortunate, as it would appear to be already well established.

Peach Canker.—The peach growers around St. Catharines and in many places in the Niagara district have recently been alarmed to find large numbers of their trees affected by a serious canker. This disease is now under investigation, and it is hoped that the observations and experiments that have been made and which are still being carried on will, in the near future, enable the Dominion Botanist to make appropriate recommendations for the control of the disease.

Cherry Disease in Prince Edward Island.—Reports were received during the spring and summer of 1911 of the prevalence of an epidemic disease affecting the cherry trees of the province. Towards the end of the summer a personal tour of inspection was made by the botanist to better ascertain the nature and extent of the trouble, and advice was given individually to numerous growers, and also by public addresses at fruit growers' meetings.

THE POULTRY DIVISION.

A marked feature of poultry development during the past year was the high price of new laid eggs and the better quality of poultry. This was particularly noticeable during the months of November, December, January and February, when the highest values were reached. It was very evident that the better the quality of the poultry and the fresher the eggs the better was the price paid for them. It is hoped that this increased appreciation of the best was a wholesome lesson to farmers to bring to market no birds but those of correct market type and of fine quality and eggs of undoubted freshness. With the view of aiding the farmers of the country to the production of poultry and eggs of this desirable quality and at a time of year when they are of the most value, the work of the poultry division has been directed for some years past. This was continued during the past year with gratifying success. It was emphasized by carefully-conducted experiments that prolific egg-laying fowls can only be built up by breeding from parent stock of undoubted egg laying merit. As a means of discovering the best egg layers among a number of fowls, the trap nest was found to be the most reliable. Among other determinations, it was made plain that, of the breeds tried, the most acceptable market type of fowl came from the well-known utility varieties of Barred and White Plymouth Rocks, White Wyandottes, White Orpingtons, Dorkings and Rhode Island Reds. The practice, too common among many farmers, of mating a small male bird of the Spanish family with a female of one of the utility varieties—with the object of procuring a good layer and market type combined—was found to result in neither object being attained. Other determinations proved that, in order to have quick-maturing chicks which will make early layers or market fowls, of the utility varieties, it is necessary that they should be hatched out not later than the second, or third week of April. Hitherto a great obstacle to success has been weak germs in the eggs laid in early spring. The adoption of poultry house of modern style which permit of abundance of fresh air and the conservation of constitutional vitality, has greatly tended to make early hatching

much more successful than heretofore, and it has been made very evident that, in order to ensure quick growth and early maturing, the chickens, of all varieties, require to be carefully and well fed from time of hatching until they are disposed of in the Fall season. Interesting experiments were also conducted with new styles of poultry houses of the open and cotton front plans. From the experience of last winter, it may be concluded that the entirely open front, or Tolman house, is not likely, in this district, to permit of a paying percentage of eggs being laid. A very large and rapidly growing correspondence in both English and French is evidence of the increasing interest being taken by the farmers of the country in the poultry branch of their farm work.

Details of other interesting experimental work will be found in the Annual Report of this Division for the fiscal year ended March 31, 1912.

GENERAL CROPS OF THE DOMINION.

FIELD CROPS AND LIVE STOCK OF THE YEAR 1911.

Reports on the condition of crops and live stock have again been collected monthly from agricultural correspondents throughout Canada. Summaries were communicated to the press as soon as ready, and the complete results were published in the Census and Statistics Monthly. Notes on the work of the various branches of my Department, crop reports from other countries, prices of agricultural produce in British markets and other information of agricultural interest were also included in this publication.

Statements of the condition of the Canadian crops and estimates of yield were forwarded regularly to the Canadian Correspondent of the International Institute of Agriculture for telegraphic transmission to Rome, while notes from the Institute's Bulletin of Agricultural Statistics and other publications were inserted in the Census and Statistics Monthly with Canadian equivalents of the metric weights and measures.

Upon the whole the agricultural season of 1911 proved favourable, though prolonged drouth in the East and a cold, wet ripening period, with storms and frost in the West, depreciated quality and lessened the yields which early conditions had promised. Excepting in the case of fall wheat the figures denoting condition, as returned during the season of growth by the crop-reporting correspondents of the Census and Statistics Office, remained high for cereals, being over 90 per cent of the standard up to June 30, and, except for rye, over 80 per cent up to the time of harvest.

The final estimates of the production and value of the principal field crops of Canada in 1911, based upon returns made by correspondents on December 31, with records of areas obtained by the census of 1911, were published as in the following table:—

Crops.	Area.	Yield per Acre.	Total Yield.	Weight per Measured Bushel.	Average Price $	Total Value.
	Acres.	Bushel.	Bushel.	Lb.	Per. Bush.	$
Fall wheat	1,172,119	22·19	26,014,000	61·12	·825	21,461,000
Spring wheat	9,201,839	20·63	189,837,300	59·21	·611	117,106,000
Oats	9,219,920	37·76	348,187,600	34·65	·364	126,814,000
Barley	1,404,352	28·94	40,641,000	46·97	·566	23,004,000
Rye	142,571	18 89	2,694,400	55 11	·774	2,086,000
Peas	287,135	15·80	4,536,100	59·58	1·025	4,647,700
Buckwheat	359,367	22 69	8,155,500	47·32	·641	5,232,000
Mixed grains	559,991	29·78	16,679,000	45·10	·607	10,127,000
Flax seed	682,622	11·52	7,867,000	53·29	1·507	11,855,000
Beans	60,630	19·06	1,155,600	58·30	1·920	2,219,000
Corn for husking	316,104	59·39	18,772,700	50 31	·648	12,171,900
Potatoes	459,097	143·82	66,023,900	.....	·60	39,358,000
Turnips, &c	227,141	373·92	84,933,000	.....	·23	19,541,000
		Tons	Tons		Per Ton	
Hay and clover	7,903,242	1·61	12,694,000	.....	11 55	146,596,000
Fodder corn	285,321	9·92	2,577.200	.....	4·84	12,469,000
Sugar beets	20,878	8·66	177,000	.....	6·58	1,165,000
Alfalfa	101,781	2·24	227,900	.....	9·868	2,249,000

NOTE.—The figures of flaxseed represent revised estimates published in the Census and Statistics Monthly of April, 1912.

This table shows that a total area in Canada of 32,404,110 acres yielded in 1911 a harvest which, computed at local market prices, had a value of $558,099,600. For wheat, Canada's principal cereal crop, the total production was estimated at 215,851,000 bushels, with a value of $138,567,000, from an area of 10,373,958 acres. This is the largest wheat crop in the history of the Dominion both as regards area and total production. Except as regards flaxseed the areas in the table represent the totals of the schedules obtained from every agricultural occupied by the census of 1911, and the total yields are calculated therefrom according to the estimated yields per acre as returned by the crop-reporting correspondents of the Census and Statistics Office. The figures of 1911 possess therefore a greater degree of statistical accuracy than can be attributed to the estimates of 1908, 1909 and 1910, published on page 36 of my predecessor's report for 1910-11, the latter being calculated from the areas as estimated by correspondents. It may, however, be mentioned that the area and yield of wheat in 1911 exceed by over 1,000,000 acres and by 65,861,000 bushels the estimated area and yield of 1910.

Data as to the numbers of live stock in Canada were collected from correspondents on June 30, and the following table gives the estimated numbers of horses, cattle, sheep, and swine for 1911 and the three previous years 1908-10.

Live stock.	1911.	1910.	1909.	1908.
	No.	No.	No.	No.
Horses	2,266,400	2,213,199	2,132,489	2,118,165
Milch cows	2,876,600	2,853,951	2,849,306	2,917,746
Other cattle	4,210,000	4,260,963	4,384,779	4,629,836
Sheep	2,389,300	2,598,470	2,705,390	2,831,404
Swine	2,792,200	2,753,964	2,912,509	3,369,858

The condition of live stock in Canada has remained generally satisfactory throughout the year.

The compilation of the census records of live stock in Canada was not completed at the end of the fiscal year.

This year in reporting to the International Institute of Agriculture it was possible to adopt the principle of the system recommended by the Institute. Under this system the condition of growing crops is expressed by numbers in a percentage scale wherein 100 represents the promise of a yield equal to the average yield of the previous ten years, supposing the crop not to be subjected to the effects of any extraordinary phenomena up to the time of harvest. As however the Canadian crop-reporting service only commenced in 1908, the average used was that of the three years 1908-10. In the returns of correspondents to the Census and Statistics Office the condition is expressed in the percentage of a standard represented by 100, and it was therefore necessary to convert from one system to the other in reporting to the Institute. The reports for the principal cereals (wheat, barley and oats) as thus converted anticipated yields of from 6 to 14 per cent above the three years' average. In the final results, as estimated at the end of December, the yields of these crops were above the average by 18 per cent wheat, 7 per cent barley and 10 per cent oats.

COST OF GRAIN PRODUCTION IN CANADA.

During February the aid of the crop-reporting correspondents of my department was sought for the purpose of instituting a statistical inquiry into the average cost of grain production in Canada and of the revenue derivable therefrom in the season of 1911. The inquiry was limited to wheat, oats, barley, corn and flax, and the schedules issued to correspondents requested for each of these crops information as to the average cost per acre of the different operations of field husbandry, the yield and value of the produce, the kind of previous crop, the value and disposal of straw and flax fibre, the value of land and the prevailing rate of interest for money borrowed upon its security. The complete results of this inquiry, with average costs, revenues and profits per acre by provinces, were published in the Census and Statistics Monthly for March, 1912. The following are the items of cost, revenue and profit per acre for the Dominion as a whole:—

Items.	Fall wheat.	Spring wheat.	Oats.	Barley.	Flax.	Corn for husking.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Preparation	3.93	3.10	3.03	2.97	3.08	4.31
Seed	1.62	1.74	1.27	1.34	1.51	.88
Seeding	1.00	1.00	.91	1.00	.88	3.37
Cultivation						2.98
Harvesting	1.72	1.55	1.58	1.54	1.28	3.18
Threshing	2.09	2.32	2.68	2.25	2.60	3.52
Wear and tear of implements	.39	.48	.45	.42	.42	.54
Rental value	2.82	2.68	2.69	2.67	2.75	3.10
Total	13.57	12.87	12.61	12.19	12.52	21.88
Value of produce	20.64	16.93	16.69	17.87	19.85	32.12
Profit	7.07	4.06	4.08	5.68	7.33	10.24

These figures are averages calculated from upwards of 1,000 effective replies from correspondents who are themselves practical farmers, including a number specially selected by the superintendent of the Dominion Experimental Farms.

HEALTH OF ANIMALS BRANCH.

The officers of this branch have, as usual, been busily engaged during the year just past. The statistics furnished in the special report of the Veterinary Director General and Live Stock Commissioner indicate the progress that has been made in securing control of the diseases dealt with under the provisions of the Animal Contagious Diseases Act.

Glanders is now well under control in every province of the Dominion with the exception of Saskatchewan, where a determined effort is being made to cope with this exceedingly troublesome disease. A large force of inspectors was detailed for constant duty in this province, with the result that 722 horses were found to be diseased, and were slaughtered, as compared with 552 in the previous year. The enormous importations of American horses and the rapid growth of settlement over a large area are the two most difficult factors in the eradication of this disease. In the other provinces the number of horses slaughtered, 123, was practically the same as the preceding year.

Dourine or Maladie du Coit has shown a gratifying decrease, the number of horses quarantined in Alberta, the province which first occupied the attention of the department in this connection, being reduced from 600 to 100, and the animals slaughtered from 40 to 12. Outbreaks have unfortunately been detected in Saskatchewan, resulting in the slaughter of five animals, and every effort is being made to eradicate the disease which, from its insidious nature, is most difficult of detection. Dr. Watson, one of the Pathologists of this branch, who has devoted a great deal of his time to the study of this disease at the Lethbridge Quarantine Station, has quite recently returned from a visit to the continent, where he familiarized himself with the most modern and improved technique for the diagnosis of this treacherous disease. With the knowledge thus gained, and the advantages derived through this opportunity of

comparing his diagnostic methods with those of continental authorities, it will now be possible to arrange to put into practical effect the latest determinative methods for the detection of dourine in infected animals which show no manifestations of disease.

Mange of horses and cattle still demands attention in the range country, where the facilities for transmission of the disease are so apparent among animals running at large. Satisfactory progress, however, is being made, and I have every hope of being able to reduce the infected areas, which are under quarantine restrictions, in the not far distant future.

Sheep Scab shows a gratifying decrease, the only outbreaks during the year being in the province of Quebec, where 41 animals were found to be affected. The animals comprising these outbreaks grazed together on the same pasture during the summer months, which limited very materially the infected area. The various premises where they were housed during the winter season have been repeatedly visited, inspected and thoroughly disinfected. The most stringent precautions were taken to ensure the prompt eradication of this disease, as well as to prevent the possibility of spreading infection. Sheep imported are closely watched, and every precaution taken to guard against the introduction of the disease from outside our boundaries.

Hog Cholera has, I regret to say, made its appearance to a considerable extent in all provinces west of Quebec, the infection having been introduced in every case by the feeding of hogs on uncooked garbage and hotel swill. 4,247 hogs were slaughtered, as compared with 1,346 during the previous year, most of these being in Ontario and Manitoba. In view of the source of infection of these outbreaks it was found advisable to amend the Hog Cholera Regulations, with a view to restricting the feeding of raw garbage. Compensation may now be forfeited in outbreaks traced to this cause, in cases where the owner persists in feeding this undesirable material after having been duly warned. All possible steps are now being taken to advise hog owners to thoroughly cook garbage before feeding, which I hope will have the desired effect of preventing or very materially limiting losses from this disease.

Rabies has still caused some anxiety in Ontario, where some 436 animals were quarantined as suspects or contacts. No other province was infected during the year, and stringent quarantine and close attention to all cases is bringing about the desired result. It has not, however, been found necessary to put into effect a general muzzling order, as with few exceptions the quarantine restrictions have been properly observed, and in many cases the owners have preferred to destory their dogs to keeping them under restrictions for lengthy periods.

Dr. Seymour Hadwen has been engaged in the work of investigating the nature and cause of Redwater among cattle in British Columbia, and full details of the result will be found in the Report of the Veterinary Director General. It is gratifying to learn from the results so far obtained that they do not point to piroplasma infection as the causative agent, but that it is more probable the ingestion of some species of plant life growing on uncultivated lands produce the symptoms and lesions found in this disease. Special efforts are also being made to collect and identify ticks found in this province, with a view to isolating and obtaining special knowledge regarding those which may play an active part as carriers of infection of disease. Dr.

Seymour Hadwen has had the advantage of special training in this work under Prof. Nuttall of Cambridge, and it is therefore reasonable to expect satisfactory results in due course.

Dr. Evans has been temporarily placed in charge of the Branch Biological Laboratory at Lethbridge during the absence of Dr. A. Watson, who has spent the winter in France and Germany in a study of laboratory methods at the various scientific centres.

It has still been found impracticable to put into operation any special measures for the control and eradication of tuberculosis, but an educational attitude has been taken. With this object in view a special effort has been made to distribute the pamphlet specially prepared by the International Tuberculosis Commission, for lay men, many thousand copies having been sent to stockmen all over the Dominion. I am in hopes that by bringing the seriousness and prevalence of this disease vividly before them they may in the near future realize fully the great menace to human life which exists through the maintenance of tuberculous herds. While I fully appreciate the great importance of taking suitable measures; I am satisfied that a united co-operation of all stockmen is essential before it is practicable to make any definite advance in this direction. Meanwhile every possible advantage is being taken to educate the public in all matters relating to this disease, with a view to obtaining concerted action at the earliest possible date.

Anthrax. A few outbreaks of this disease have been dealt with in old infected centres, but fortunately with the exception of an outbreak in sheep at Lethbridge, no new areas have become infected. Anthrax and Black Quarter vaccines are prepared at the Biological Laboratory connected with this Branch and are procured upon application by stockmen for the very reasonable sum of five cents per dose.

The enforcement of the regulations with regard to the cleansing and disinfection of stock cars, stockyards and cattle markets has been thoroughly attended to and a comparatively high standard has been reached.

The quarantine service along the boundary has been kept up to strength and improvements made in the accommodation provided for stock as fast as time and means would permit.

THE MEAT INSPECTION DIVISION.

The Meat Inspection Division of this branch has gradually extended its operations, many new establishments engaged in export trade having been placed under the supervision of the inspectors.

While, approximately, an increase of fifty thousand sheep and lambs and four hundred thousand swine, has been slaughtered under inspection, practically no difference is shown in the number of cattle killed.

An increase in the local demand for meats and meat food products bearing the inspection legend testifies to the appreciation by the general public of the work carried on under the operations of the Meat and Canned Foods Act. I feel satisfied that this demand, if encouraged, could be considerably extended by the managers of establishments placing more prominently before their customers the fact that such meats and meat food products as bear the crown, the words 'Canada Approved' and the official

number of an establishment, are from animals free from disease, and that their preparation and cure have been carried on in a sanitary manner.

The officers engaged in carrying on this trying and arduous work are to be commended for the faithful and loyal manner in which they have performed their duties, which entail long hours of labour under what cannot be considered the most enviable conditions.

The supervision in connection with the canning of fruits, vegetables and milk is shown by the improvement in the quality of these foods and their increased consumption, and I may say that the advancement in the sanitary conditions of the canning factories is fully up to our expectations.

ARCHIVES.

A report of the operations of this Branch has been made by the Dominion Archivist and has been printed separately as an appendix to this report.

PUBLICATIONS BRANCH.

The Publications Branch has been organized for the purpose of dealing with the International Agricultural Institute, to which Canada is one of the adhering countries, and with the distribution of the publications of the department.

THE INTERNATIONAL AGRICULTURAL INSTITUTE.

By the beginning of 1911 the different services of the International Agricultural Institute at Rome were completely organized and in full operation. The information collected by these services is published in four monthly bulletins: 'Bulletin of Agricultural Statistics,' 'Bulletin of Economic and Social Intelligence,' 'Bulletin of Agricultural Intelligence and of Plant Disease,' and 'Bulletin of Commercial Statistics.'

The 'Bulletin of Agricultural Statistics' furnishes information concerning area, production, and condition of crops in the fifty different countries of the world which adhere to the institute. This information is based on official data supplied to the Institute by the governments of these countries. In addition to the monthly bulletin and the supplements which are often issued, the Institute, on the date of publication, telegraphs a summary of the important contents of the bulletin to the governments of the countries. This feature is of special value to countries which, like Canada, are distant from Italy and receive the bulletin from twelve to fifteen days after its publication at Rome.

'The Bulletin of Economic and Social Intelligence' deals with agricultural co-operation and association, insurance, credit and economic questions relating to agriculture. During the past year there have been published in it detailed accounts of the splendid systems of agricultural organization in Great Britain and Ireland, United States, Germany, Denmark, France, and other European countries.

'The Bulletin of Agricultural Intelligence and of Plant Diseases' consists of summaries and extracts from reports, bulletins and periodicals, both official and private. The articles embrace agricultural chemistry, botany, the cultivation of crops, rural engineering, live stock and live stock products, agricultural industries and machinery, plant diseases, and destructive insects. Several hundred of the most

important agricultural periodicals and bulletins of all the adhering countries are therein reviewed or summarized, and an indication of the sources of information is given so that the original article may be procured if it is available.

'The Bulletin of Commercial Statistics.' At the General Assembly of the International Agricultural Institute held in May, 1911, which was attended by Hon. Senator Boyer and the Canadian Commissioner of the Institute as the delegates for Canada, it was decided to inaugurate on the first of July, 1912, a regular service of information on statistics concerning the trade in leading agricultural products. This service will comprise statistical information as to visible stocks of cereals, imports and exports, as well as the weekly prices in the principal markets. The reports as to stocks will refer to wheat, rye, barley, oats and corn only, while those relating to imports and exports and prices will also include rice and cotton. Meanwhile, the Institute in the opening months of 1912 started this service tentatively by means of a bulletin intended for the preliminary period not for publication but only for the use of the adhering governments and the members of the Permanent Committee of the Institute. The 'Bulletin of Commercial Statistics' will be started as an authorized publication of the Institute on the first of July, 1912, and will thereafter be published regularly every month.

It is the duty of the Canadian Commissioner of the Institute, on the one hand, to furnish to the Institute all the data needed concerning Canada for the various publications. Some of this information is obtained from other branches of this department, and from other departments of the federal government. Some consists of information summarized from the publications of the federal and provincial governments, from the reports of large agricultural associations and the principal periodical publications. Monographs on agricultural organization and on agricultural education in Canada have been prepared and forwarded for publication.

It is, on the other hand, the duty of the Canadian Commissioner, to make the information published by the Institute available to as many Canadian agricultural readers as possible. Only a few of the original Institute publications can be obtained for distribution in Canada and these are communicated to the agricultural departments of the Dominion and of the provinces, and to the agricultural colleges. In order to extend the benefit of the information to the agricultural press, the graduates of agricultural colleges, well-read practical farmers, agricultural economists, boards of trade, bankers, shippers, &c., it has been deemed necessary to issue monthly a bulletin called 'The Publications of the International Agricultural Institute.' This Canadian bulletin contains such portions of the contents of the four Institute bulletins as are deemed of interest and value to Canadians. Summaries are made of articles too lengthy for reproduction. As a supplement to this bulletin, multigraph sheets are issued whenever a cablegram crop report is received from the Institute or other important news concerning the world's crops has come to hand. These are promptly sent to the agricultural press and persons particularly interested.

The figures concerning area and production of crops are in the original bulletins stated according to the metrical system of weights and measures. In the Canadian bulletin, for the purpose of making the statistics readily intelligible to Canadian read-

ers, hectares and quintals are converted into acres and bushels in accordance with the Canadian legal standards.

For the Commissioner's work in furnishing to the Institute the requisite information concerning Canada and in utilizing for the advantage of Canadians all the information collected and published by this Agricultural Information Bureau, a properly equipped library has become necessary. The library of the Publications Branch comprises all the Canadian publications relating to the objects of the Institute, whether federal, provincial, official or private; the federal and provincial statutes; the publications of the United States Department of Agriculture; of the United States Department of Commerce and Labour; of 42 United States Experiment Stations, and 31 State Boards of Agriculture; and similar publications from Great Britain and Ireland, Australia, India, France, Italy, Denmark, Belgium, Norway, Sweden, Argentina, Newfoundland, Jamaica, South Africa, Paraguay, New Zealand, Russia and Austria-Hungary.

The library cards published by the library of the United States Congress are used as a means of classifying the publications in the library and is a pretty complete bibliography of agricultural works published in any country in any language. The Publications Branch has over 50,000 of these cards, 10,000 of which represent the publications of the United States Department of Agriculture. The cards are being arranged in alphabetical order by subject and author, and are being numbered according to the Dewey Decimal system of classification as adapted by the International Agricultural Institute to agricultural publications. These cards, although primarily for the use of the Publications Branch may, when completely classified, be utilized to advantage by other officials of the federal Department of Agriculture or by other agricultural students, writers, and investigators in Canada.

DISTRIBUTION OF PUBLICATIONS.

Before the distribution of publications for the various branches of the department could be undertaken, a large amount of preliminary work had to be done. Until the middle of January when adequate quarters were made available, the small staff employed were fully engaged in getting the several lists in order, addressing envelopes for some of the branches, mailing publications pertaining to the International Agricultural Institute, and multigraphing and sending out cabled statistics relative to the world's crops.

The several lists, numbering some twenty-seven including about 150,000 English and Franch names when taken over, were found to be classified alphabetically within provinces. This arrangement was satisfactory so far as an office record was concerned, but it was not well adapted to revision purposes. After careful consideration, it was decided to classify the names by constituencies further subdivided by post offices, and names within them, arranged alphabetically. This classification was applied to all except a small number of special lists not adapted to this treatment.

In most of the branches the addressing of envelopes was done by hand. In two cases only—the Fruit list of the Dairy and Cold Storage Branch and Experimental Farm List—the envelopes were addressed more or less satisfactorily by mechanical

contrivances. After a full investigation of the merits of several systems a machine that prints from metal stencils was decided on and procured. To use this machine it was necessary to have a stencil made for every name on every list. This has been done and the stencils so arranged as to form a readable index so as to be easily revised as required.

As was expected it was found that in many cases the same name appears on different lists. In order to readily locate such names when a change of address was ordered, a card index has been revised which shows a complete list of every name on all the lists and to which and how many of the lists each belong. Thus a personal record is kept of each reader, in such manner that the branch knows what publications each has been reading. Thus the branch can at a glance recognize the reader's place of residence (post office and county) and consequent needs, and be in a position to judge whether any particular agricultural centre is or is not adequately supplied with the department's publications. Good progress has been made in preparing this index which, it is hoped, will be available for use as soon as the office equipment is completed.

Commencing in May this branch addressed monthly the mailing lists of the Fruit Division of the Dairy and Cold Storage Branch and of the Census and Statistics Monthly. It also sent out all through the year the publications received from the International Institute as well as the Canadian bulletin entitled 'The Publications of the International Agricultural Institute.' The Canadian bulletin issued monthly was sent to about 7,000 addresses.

From month to month reports of condition and supplies of the world's crops, cabled by the International Institute, have been promptly multigraphed and sent out to a large list of interested persons including bank managers, grain exchanges, boards of trade, newspapers and others.

Since early in the year 1912 when this branch moved into its present quarters, the general distribution of the publications of the department have been undertaken.

The publications thus sent out included 75,000 copies of the report of the Experimental Farms for 1911; 60,000 copies of the Annual Experimental Plot Bulletin; four publications of the Seed Branch involving 95,000 copies; 12,000 copies of the report of the International Commission on the Control of Tuberculosis; and 2,000 copies of the Live Stock publication, Report No. 3 of the Record of Performance.

The experience of the few months that the Distribution Division of the Publication Branch has been in operation amply demonstrates the wisdom of the consolidation of this work. Under the old system of hand addressing, individual branches at times found it necessary to keep employed for a shorter or longer period from three or four to half a dozen or more clerks addressing, filling and sealing envelopes. Under the new system an addressing machine run by one man is able to accomplish as much as twelve industrious penmen. From time to time as occasion requires, other labour-saving machines will be introduced. The advantage of this, which would not have been practicable under the old system, will be appreciated when it is understood that about one and one quarter million pieces of printed matter are mailed by the department in the course of a year.

III.—PATENTS OF INVENTION.

The following tables show the transactions of the Patent Office, Department of Agriculture, from April 1, 1911, to March 31, 1912:—

Applications for Patents.	Patents and Certificates Granted.			Caveats.	Assignment of Patent.	Notices under Section 8.
	Patents.	Certificates.	Total.			
8,293	7,399	1,113	8,512	348	3,725	980

Detailed Statement, Patent Office Fees.

Month.	Notices.	Patents.	Assignments.	Certified Copies.	Caveats.	Sundries.	Subscriptions.	Total.
1911.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
April	168 75	16,527 35	771 90	143 95	206 00	11 75	13 15	17,842 85
May	162 00	16,602 80	676 60	220 75	190 00	11 75	97 40	17,961 30
June	143 00	16,441 65	635 00	261 89	170 25	8 00	150 34	17,810 13
July	152 00	14,600 20	597 00	282 45	130 00	15 00	29 55	15,806 20
August	174 00	15,426 35	666 50	208 50	145 00	14 00	28 20	16,662 55
September	144 00	14,215 90	625 00	216 60	110 00	0 25	28 00	15,339 75
October	133 00	15,194 75	748 25	312 05	117 00	27 00	30 20	16,562 25
November	142 50	15,838 10	670 00	246 00	130 00	12 00	14 00	17,052 60
December	119 00	15,361 70	676 15	194 60	175 00	7 00	19 20	16,552 65
1912.								
January	170 00	15,675 75	618 25	286 25	170 00	24 60	32 80	16,977 65
February	211 00	17,571 90	893 90	275 10	214 90	16 20	18 20	19,201 20
March	240 00	18,282 40	793 00	205 39	170 00	45 70	257 15	19,993 64
	1,959 25	191,738 85	8,371 55	2,853 53	1,928 15	193 25	718 19	207,762 77

The Canadian patentees were distributed among the provinces of the Dominion as follows:—

Ontario.	Quebec.	British Columbia.	Manitoba.	Alberta.	Saskatchewan.	Nova Scotia.	New Brunswick.	Prince Edward Island.	Yukon.
531	233	97	72	56	47	30	17	0	0

Patents issued to residents of Canada, with the ratio of population to each patent granted:—

Provinces.	Patents.	One to every.
British Columbia	97	4,046
Ontario	531	4,752
Manitoba	72	6,328
Alberta	56	6,690
Quebec	233	8,595
Saskatchewan	47	10,477
Nova Scotia	30	16,411
New Brunswick	17	20,699
Prince Edward Island		
Yukon		

NATIONALITY OF FOREIGN INVENTORS.

Countries.	1908.	1909.	1910.	1911.	1912.
United States of America	5,030	4,602	5,021	4,885	4,997
Great Britain	313	346	392	359	506
Germany	214	215	241	304	336
Australia	76	58	60	77	99
France	91	59	75	97	108
New Zealand	31	36	37	33	46
Sweden	46	40	39	54	52
Belgium	18	17	20	25	20
Austria	14	33	23	20	24
Italy	14	10	8	12	6
Switzerland	13	11	12	26	23
Denmark	29	8	8	5	14
Transvaal	6	12	12	16	10
Hungary	8	5	7	6	6
Russia	5	4	14	18	6
Norway	13	9	18	20	17
Newfoundland	4	1	2	3	1
Netherlands	0	4	0	0	
Mexico	4	4	11	7	10
Cape Colony	0	1	0	3	4
Cuba	3	0	1	5	1
Spain	0	2	1	3	
Chili	0	1	0	1	
Finland	5	1	0	1	
Portugal	0	1	0	0	
Roumania	0	1	0	1	1
Grand Duchy of Luxemburg	2	1	0	0	
Algeria	1	0	0	1	
Japan	3	1	2	0	2
India	1	0	0	5	3
Natal	1	0	0	0	1
Nicaragua	1	0	0	1	
Brazil	1	0	0	2	1
Turkey	1	0	0	0	
Poland	1	3	2	0	
Holland	10	0	2	11	8
Argentina		4	5	1	1
Panama (Canal Zone)		2	0	0	3
Egypt			1	1	
Southern Rhodesia			1		
Peru					3
Hawaii					3
Venezuela					2
Trinidad, W.I.					1
Porto Rico					1

Statement of the number of patents issued under the Act, on which the fees are paid for periods of six, twelve or eighteen years, at the option of the patentee; and of patents on which the certificates of payments of fees were attached after the issue of patents originally granted for periods of six and twelve years.

Period for which Fees were paid on First Issue.			Patents on which Certificates were attached after issue.		Reissues.		
6 years.	12 years.	18 years.	6 years.	12 years.	6 years.	12 years.	18 years.
7,368	4	29	1,073	40	12	1	1

COMPARATIVE STATEMENT of the transactions of the Patent Office from 1872, when foreign applications were first admitted, to 1912, inclusive.

Year.	Applications for Patents.	Patents and Certificates Granted.			Caveats.	Assignments of Patents.	Fees received.
		Patents.	Certificates.	Total.			
							$ cts.
1872	752	671	.....	671	184	327	18,651 65
1873	1,124	1,016	10	1,026	171	547	28,889 64
1874	1,376	1,218	27	1,245	200	711	32,962 48
1875	1,418	1,266	57	1,323	194	791	33,380 82
1876	1,548	1,337	46	1,383	185	761	34,429 38
1877	1,445	1,277	75	1,352	168	841	33,656 30
1878	1,428	1,172	96	1,268	172	832	31,992 42
1879	1,358	1,137	101	1,238	203	728	30,868 88
1880	1,601	1,252	156	1,408	227	855	38,334 99
1881	1,956	1,510	222	1,732	226	907	48,083 95
1882	2,266	1,846	291	2,137	198	955	55,854 79
1883	2,641	2,178	291	2,469	242	1,052	67,625 48
1884	2,681	2,456	167	2,623	238	1,772	63,257 47
1885	2,518	2,233	214	2,447	222	1,075	62,176 23
1886	2,776	2,610	250	2,860	187	1,322	67,176 23
1887	2,874	2,596	254	2,850	219	1,335	67,940 21
1888	2,747	2,257	282	2,539	240	1,159	65,246 51
1889	3,279	2,725	356	3,081	221	1,437	78,046 72
1890	3,560	2,428	369	2,797	248	1,307	84,150 78
1891	3,233	2,343	393	2,736	215	1,231	77,723 63
1892	3,176	3,417	415	3,832	242	1,500	77,216 76
1893 (Only 10 months)	2,614	3,153	292	3,445	229	1,345	63,850 19
1894	3,291	2,756	462	3,218	301	1,445	80,682 56
1895	3,387	3,074	422	3,496	343	1,550	86,358 48
1896	3,728	3,488	413	3,901	306	1,420	93,532 52
1897	4,300	4,013	284	4,297	377	1,551	102,117 92
1898	4,200	3,611	262	3,873	363	1,657	99,361 95
1899	3,305	3,151	412	3,563	311	1,467	107,261 56
1900	4,628	4,522	482	5,004	283	1,914	113,852 46
1901	4,817	4,766	551	5,317	302	2,323	120,064 37
1902	5,201	4,391	510	4,901	317	2,339	129,896 82
1903	5,912	5,673	432	6,105	328	2,384	141,363 81
1904	6,061	6,091	517	6,607	303	2,472	145,896 10
1905	6,355	6,111	536	6,647	300	2,576	152,085 45
1906 (Only 6 months)	2,857	2,378	271	2,649	137	1,232	69,700 46
1907	7,077	6,121	634	6,755	285	3,003	169,548 78
1908	7,406	6,774	744	7,518	317	2,900	178,482 49
1909	7,239	6,395	827	7,222	319	3,001	176,692 05
1910	7,789	7,223	1,010	8,233	448	3,147	194,571 54
1911	8,037	7,249	1,002	8,251	406	3,356	200,164 41
1912	8,293	7,399	1,113	8,512	348	3,725	207,762 77

The total revenue of the Patent Office for the year ending March 31, 1912, was $207,762.77.

The number of new applications for patents presented during the year was 8,293, an increase over the preceding year of 256.

The total number of reports issued by the examiners during the year was 10,934 and 14 patents were surrendered and reissued.

Out of the total number of patents granted by this office during the year there were 4,997 issued to inventors, or issignees resident in the United States, being 67 per cent of the whole issue.

This branch of my department continues to receive the official reports of patents from Great Britain, Australia, United States, Mexico and Japan, in addition to other periodicals of a scientific nature, in exchange for the Canadian Patent Office Record.

There were 1,789 patents brought under the conditions of the Compulsory License clause, section 44, of the Patent Act during the year.

The number of notices under section eight of the Patent Act was 980.

The present fiscal year shows an increase in the business of the Patent Office and in its revenue. The total amount of fees received was $207,762.77, being the largest receipts for the same period of time in the history of this branch of my department, the increase over the preceding year amounting to $7,598.36.

IV.—COPYRIGHTS, TRADE MARKS, INDUSTRIAL DESIGNS AND TIMBER MARKS.

STATEMENT of fees received by the Copyright and Trade Mark Branch from April 1, 1911, to March 31, 1912.

Months.	Trade Marks.	Copyrights.	Designs.	Timber Marks.	Assign-ments.	Copies.	Total.
1911.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
April	3,644 50	135 50	55 15	4 00	42 00	72 75	3,953 90
May	4,193 70	160 65	70 00	....	39 50	35 00	4,498 85
June	4,929 70	129 00	59 00	6 00	36 00	32 75	5,192 45
July	2,675 50	96 50	25 00	4 00	51 00	20 75	2,872 75
August	3,245 55	97 40	49 00	24 00	16 00	24 50	3,456 45
September	2,969 90	151 50	25 00	4 00	24 00	24 00	3,198 40
October	2,788 30	145 90	39 00	2 00	16 00	24 50	3,015 70
November	3,754 75	174 00	45 00	8 00	78 00	27 75	4,087 50
December	3,051 55	196 00	55 00	14 00	31 15	28 75	3,376 45
1912.							
January	3,163 40	162 40	45 00	4 00	34 00	43 00	3,451 80
February	4,204 40	152 50	115 00	2 00	64 15	54 75	4,592 80
March	3,955 30	158 21	435 15	2 00	62 90	17 25	4,630 81
	42,576 55	1,759 56	1,017 30	74 00	494 70	405 75	46,327 86

The particulars of the registrations made by the Copyright and Trade Mark Branch of the Department of Agriculture during the year ended March 31, 1912, are as follows:—

I. COPYRIGHTS—		
Full copyrights without certificates	1,260	
Full copyrights with certificates	185	
Temporary copyrights without certificates	55	
Temporary copyrights with certificates	7	
Interim copyrights without certificates	65	
Interim copyrights with certificates	21	
Renewals of copyrights	2	
Assignments of copyrights	12	
		1,607
II. TRADE MARKS		1,212
Renewals of specific trade marks	40	
Assignments of trade marks	197	
III. INDUSTRIAL DESIGNS		149
Renewals	28	
Assignments	9	
IV. TIMBER MARKS		39
Assignments	12	
Total registrations		3,293

The following table shows a comparative statement of the business of this branch from 1897 to 1911, inclusive:—

Year.	Letters Received.	Letters sent.	Copyrights Registered.	Certificates of Copyrights.	Trade Marks Registered.	Industrial Designs Registered.	Timber Marks Registered.	Assignments Registered.	Fees Received.
									$ cts.
1897	2,606	3,548	756	273	446	75	13	94	14,101 93
1898	2,576	3,453	734	275	423	136	15	114	13,535 17
1899	2,487	2,910	702	237	430	112	5	117	14,161 28
1900	2,679	3,213	893	247	447	126	22	136	14,782 53
1901	2,605	3,211	888	149	521	146	24	183	16,823 20
1902	2,687	3,257	900	196	528	164	26	222	17,703 00
1903	2,687	3,211	900	176	557	88	23	272	18,086 25
1904	2,858	3,293	1,106	228	621	107	25	118	20,647 30
1905	3,367	3,902	1,130	189	661	139	22	154	23,706 75
1906	5,340	5,193	1,228	169	1,119	125	47	282	33,107 10
1907	4,475	4,353	1,140	175	848	182	33	136	30,073 20
1908	6,647	4,980	1,416	170	892	162	44	343	37,514 00
1909	6,320	5,750	1,535	171	1,059	143	108	174	38,071 31
1910	6,411	7,668	1,699	206	1,021	118	39	286	42,153 76
1911	7,027	7,091	1,593	213	1,212	149	39	230	46,327 86

V.—PUBLIC HEALTH AND QUARANTINE.

Perhaps the most notable event in public health matters during the year has been the persistence of Asiatic Cholera in some parts of Europe, and especially in Italy.

It has shown itself this year in Arabia, Austro-Hungary, Bulgaria, Ceylon, China, Formosa, France, Hawaii, Dutch East Indies, India, Indo-China, Italy, Japan, Java, Korea, Madeira, Malta, Montenegro, Persia, Philippine Islands, Roumania, Russia, Servia, Siam, Straits Settlements, Sumatra, Tripoli, Tunis, Turkey in Asia and in Turkey in Europe.

Owing to prevalence of cholera in Italy in epidemic form, and the recent recognition of apparently quite healthy persons who are nevertheless 'cholera carriers,' it became expedient that all immigrants coming directly or indirectly from the infected districts of Europe should undergo a bacteriological examination before being allowed to enter the country. A special bacteriologist was therefore appointed to each of the ports of passenger entry on the Atlantic side—Halifax, St. John and Quebec—to be stationed at the quarantine stations guarding those ports.

The wisdom of this course was proven by the fact that amongst the healthy arrivals at Grosse Isle examined bacteriologically, two 'cholera carriers' were discovered,

held and dealt with until they ceased to be a menace to the public health of the community. These two cases, with the one mentioned in the last Annual Report, make three 'cholera carriers' found at quarantine within a few months. The first one found in November, 1910, continued to give positive evidence of still being a 'carrier' into April, 1911, and it was only in May last that he ceased to be dangerous. This persistence of his condition even under treatment from November to May shows over how wide an area and for how long he might have spread Asiatic cholera inland throughout Canada, had his condition not been recognized and stamped out at quarantine.

The ministerial order for the bacteriological examination of immigrants from infected countries was issued in July, and remained in full force until the improvement in the cholera situation abroad in November last. I was then able to modify it to apply only to immigrants on infected vessels.

Owing to the development of a case of cholera at New York subsequent to a five-day detention, the period of observation under quarantine for cholera suspects has been enlarged both by the United States and this country to a period of ten days.

Bubonic Plague has been present during the last year in Algeria, Arabia, Azores, Brazil, British East Africa, British South Africa, Chili, China, Dutch East Indies, Ecuador, Egypt, German East Africa, Hawaii, India, Indo-China, Japan, Java, Mauritius, New Caledonia, Peru, Philippine Islands, Russia, Siam, Straits Settlements, Trinidad, Turkey in Asia and Venezuela.

A case of plague was reported in Glasgow in June last, and one at Shotley, Suffolk, in November last, a sailor thought to have derived the infection from a rabbit. Cases occurred in California in July, August and September last. Plague infected rats were found in the city of Seattle up to the 21st September last, and plague infected ground squirrels in California up to the 27th October last.

Monthly supplies of Yersin's anti-plague serum are regularly received by me from the Lister Institute in London, England, and held ready to be rushed to any point should occasion arise.

With the completion of the Dominion National Biological Laboratories, which I am inaugurating, Canada's dependence on outside countries for such preventive and remedial products should happily cease.

Leprosy.—There are at this date in my Leper Lazaretto at Tracadie, N.B., twenty-two patients, twelve males and ten females. Eighteen are of French Acadian origin, two of English, one of Icelandic and one of Russian.

One death occurred during the year, and three new cases were admitted.

It has given me pleasure to sanction the gift of a small organ for the use of the patients. This must tend to relieve the monotony of their lives, and help them to forget their sufferings.

My Leper Lazaretto at Darcy Island, B.C., has not been occupied by any leper since the last deported, previous to this year.

Smallpox.—Smallpox has again prevailed as a pandemic throughout the world, during the year. It has been brought to two of my stations. To the River St. Lawrence quarantine six passenger steamships brought it, and at my William Head

station beyond Victoria, B.C., it was brought by two steamships, and a third—a coastwise passenger steamer—was permitted to be dealt with at William Head. In every case at each station the disease was stamped out at quarantine.

At the date of the last annual report, owing to the prevalence of smallpox in the neighbouring states to the south of the line, special medical inspection of persons entering across the frontier was being carried out at North Portal, Saskatchewan, and at Fort Frances and Rainy River, Ontario. Owing to the subsidence of the epidemic threatening, I was enabled to raise these temporary quarantine inspections on November 15 last.

Owing to the prevalence of smallpox in Nova Scotia and New Brunswick, temporary quarantine inspection of all arrivals from the mainland was being carried on at Georgetown, P.E.I., at the date of the last annual report. This was supplemented on the 26th of April last by the appointment of a special temporary medical inspector at the port of Summerside, P.E.I., and the enforcement of inspection at Charlottetown by the permanent quarantine officer of all arrivals from the mainland including the daily steamers from Pointe du Chêne and Pictou respectively.

These special inspections I was enabled to raise on the 18th November last.

Typhus Fever.—This virulent infectious disease which used to be so frequent as Ship Fever, Jail Fever, Camp Fever and the Famine Fever of 1847 in Ireland, but which has been much less frequent of late years, presented itself on a vessel at my St. Lawrence quarantine, but was successfully stamped out there.

In view of the general movement in China for the abolition of the pig-tail, it was thought that such hair might be imported into this country for trade purposes. I therefore deemed it well in January last to cause an amendment to the quarantine regulations to be proclaimed in the *Canada Gazette,* providing for the disinfection of unmanufactured and uncleaned hair before it is allowed to enter into Canada.

Vessels that clear from United States ports south of San Francisco are mostly coastwise and have usually taken down cargoes from British Columbia, or have sailed to such southern port from San Francisco, or they are new vessels coming from England for the coasting trade in British Columbia, and simply call in for coal. The piers at which they touch are at some distance from the towns, and there is probably less contact with inhabitants on shore than is usually the case with vessels in port. Moreover, the conditions as regards the health of the communities in Southern California are as readily ascertained as are those of the communities back of San Francisco. I have, therefore, extended the exception from routine inspection given by ministerial order under Section 7 of the Quarantine Regulations to vessels from San Francisco and ports north thereof, so as to include vessels from all ports on the Pacific Coast of the United States.

These exceptions under section 7 are only temporary, and can be set aside at any time by my order should circumstances render it advisable.

Circular letters of warning and instruction were issued to officers from time to time; and strict measures—ordinary and special—have been applied for the sanitary protection of the country.

The medical service has suffered during the year by the accidental death by drowning of Dr. Doule, the Assistant Quarantine Officer at Halifax. He has

been replaced by Dr. V. N. MacKay, as Bacteriologist and Medical Assistant. Drs. Heagerty and Warwick have been appointed Bacteriologists and Medical Assistants at Grosse Isle and St. John respectively. And subsequent to the resignation of Dr. Walker of William Head, B.C., to take up other work, his place as Bacteriologist and Medical Assistant at that station has been filled by the appointment to those offices of Dr. Hunter.

Owing to the ever-increasing influx of immigrants by the St. Lawrence, a further medical assistant must soon be appointed at Grosse Isle.

The inclusion in the new estimates of an item toward a National Biological Laboratory marks a very signal advance in the public health history of Canada.

Plans of the Grosse Isle Quarantine Station and models of some of its scientific appliances were sent to the International Exhibition of Hygiene at Dresden. The special commissioner, Dr. Hansberger, of Berlin, Ontario, who was in charge of and explained our exhibit in German and in English, reports that: 'The Canadian exhibit was much admired and commended by all. Compared with others of similar character in the exhibition, its outstanding features were its excellent location, complete equipment, thorough organization, and rigid enforcement of all regulations.'

The Governor General of Australia by despatch to the Governor General of Canada introduced to us Dr. J. Perrin Norris, Director of Public Health of Australia. That Commonwealth sent Dr. Norris to acquire public health knowledge in the different countries of the world. By my instruction my Director-General of Public Health arranged for his seeing the quarantine station at William Head, B.C., and upon his arrival in Ottawa explained our system to him, and took him down to and over the quarantine station at Grosse Isle in the River St. Lawrence. My officer also made him known to the immigration officials at Quebec, all national medical matters—including immigration, marine hospitals, adulteration of food and drugs, in addition to quarantine and leprosy—being in Australia under the Director of Public Health.

VI.—CENSUS AND STATISTICS.

The Canada Year Book for 1910, being the sixth volume of the second series was published in June, 1911. Progress was made with the preparation of the Year Book for 1911, and the bulk of the manuscripts of the statistical tables was delivered to the Printing Bureau before the close of the fiscal year.

The report on the Criminal Statistics of 1910 was issued, and the report for 1911 is now being prepared.

The fifth census of Canada was taken as for June 1, 1911, by 264 commissioners and 9,703 enumerators. The first preliminary announcement of the population was made on October 17, 1911, and on February 26, 1912, was published a special report of 172 pages giving the areas and the population according to the census of 1911 by provinces, districts and subdistricts. The following statement shows the total population by provinces compared with the census of 1901:—

Provinces.	1901.	1911.	Increase.	Increase p.c.
Alberta	73,022	374,663	301,641	413·08
British Columbia	178,657	392,480	213,823	119·68
Manitoba	255,211	455,614	200,403	78·52
New Brunswick	331,120	351,889	20,769	6·27
Nova Scotia	459,574	492,338	32,764	7·13
Ontario	2,182,947	2,523,274	340,327	15·59
Prince Edward Island	103,259	93,728	−9,531	−9·23
Québec	1,648,898	2,002,712	353,724	21·45
Saskatchewan	91,279	492,432	401,153	439·48
Yukon	27,219	8,512	−18,707	−68·73
Northwest Territories	20,129	17,196	−2,933	−14·57
Totals for Canada	5,371,315	7,204,838	1,833,523	34·13

NOTE—The Sign minus (−) in the foregoing denotes a decrease.

The rural population in 1911 was returned as 3,924,394 and the urban population as 3,280,444. The increase of rural population is therefore 555,376, and of the urban 1,278,147, which is 16·48 per cent for the former and 63·83 per cent for the latter.

Good progress has been made with the compilation of the other tables of population by what is called the card system. At the end of the fiscal year the records of more than 4,370,000 persons had been transferred from the original schedules to the cards. Upon the completion of this work the various tables of ages, origins, nativities, immigration, religions, occupations, literacy, language spoken, school attendance, wage earnings, &c., will be assembled on electrical machines and made ready for the press. The schedules of manufactures and agriculture are in the hands of two staffs of compilers, and at the close of the fiscal year good progress had been made in the preparation of the tables for publication.

The census records of butter, cheese and condensed milk produced in Canada in 1910 were published in the Census and Statistics Monthly of March, 1912. They show that there were 3,628 factories in operation. The quantity of butter made in the year was 59,875,097 lb. of the value of $15,682,564, compared with 36,056,739 lb. of the value of $7,240,972 in 1900. The quantity of factory cheese made in 1910 was 231,012,798 lbs. of the value of $21,620,654, compared with 220,833,269 lb. of the value of $22,221,430 in 1900. The number of condensed milk factories increased from four in 1900 to twelve in 1910, and the value of the produce increased from $269,520 to $1,839,871.

The work of the census has necessitated the employment of a large extra staff appointed under authority of the Civil Service Amendment Act, 1910 (9-10 Edw. VII. c. 8, s. 7). On March 31, 1912, the total number of temporary clerks engaged in census work was 173 (31 male and 142 female).

By Order in Council, dated March 30, 1912, the Census and Statistics office was transferred from my department to the Department of Trade and Commerce as from April 1, 1912.

The whole respectfully submitted.

MARTIN BURRELL,
Minister of Agriculture.

PUBLIC HEALTH.

APPENDIX No. 1.

REPORT OF THE DIRECTOR-GENERAL OF PUBLIC HEALTH.

(F. MONTIZAMBERT, I.S.O., M.D. Edin., F.R.C.S.E., D.C.L.)

March 31, 1912.

SIR,—I have the honour to submit this my report as Director-General of Public Health, for the year ending this day.

Amongst the continued threatenings of infectious diseases from abroad that of Asiatic cholera has been the gravest in its menace to this country.

Asiatic cholera.—Since my last annual report this disease has been reported in the following countries: Arabia, Austria-Hungary, Bulgaria, Ceylon, China, Formosa, France, Hawaii, Dutch East Indies, India, Indo-China, Italy, Japan, Java, Korea, Madeira, Malta, Montenegro, Persia, Philippine Islands, Roumania, Russia, Servia, Siam, Straits Settlements, Sumatra, Tripoli, Tunis, Turkey in Asia, and Turkey in Europe.

The outbreak of this disease has been most pronounced. The threatening to this country has been great owing to the large number of passenger vessels plying directly from Italian ports to ports in the United States, and the considerable number of Italian passengers who arrive at Canadian ports indirectly by English and Continental lines. At the height of the epidemic in Italy, there were reported in Italy between June 8 and August 12 last, 5,591 cases with 2,199 deaths.

On June 13 the steamship *Berlin* arrived at New York from Italian ports with the history of having had a death at sea from cholera. On the following day the *Europa* arrived at New York Quarantine with a case of cholera aboard, and on June 20 the *Duca Degli Abruzzi* arrived with four cases. Other vessels also arrived with cases of cholera, or cholera carriers.

The occurrence of these cases among passengers who had been detained under observation for a period of five days before embarkation indicated that cholera carriers were becoming an important factor. Cholera bacillus carriers are individuals who carry the vibrio of cholera in their intestinal tracts, or probably at times in the gall bladder, and yet exhibit no clinical symptoms of the disease. Persons who have had the disease and recovered may continue to be carriers for days or weeks, others may be carriers for a short period before developing clinical symptoms, and still others, who have been in direct or indirect contact with the sick or with other carriers, may become carriers for varying periods without being ill at any time. In places where cholera is epidemic there will usually be found a number of healthy carriers. Past Assistant Surgeon McLaughlin found six to seven per cent of carriers among healthy individuals living in the infected neighbourhoods in Manila. The cholera carrier is undoubtedly a much more potent factor in the spread of the disease from one locality to another than are actual cases of the disease. The sick are readily detected and isolated, but the detection of healthy carriers is a far more difficult problem and requires a careful and painstaking bacteriological examination, which usually takes at least two days to complete.

In compliance with the United States Quarantine regulations, persons coming from cholera infected localities are detained under observation for a period of five days before being allowed to embark at foreign ports. On account of the continued prevalence and spread of the disease in Italy the United States consuls at all Italian ports have been directed to hold all steerage passengers five days, no matter from what section of Italy. They are not allowed to take foodstuffs on board.

These precautions apparently blocked all avenues by which the disease could be brought to this country with the possible exception of the cholera carrier, to eliminate whom an addition was made to the quarantine regulations July 19, 1911, requiring that all steerage passengers arriving at United States ports from ports or places infected with cholera shall be subjected to a bacteriological examination and shall not be admitted to entry until it has been determined by such examination that they are not cholera carriers.

Here in Canada we had our first experience of a cholera carrier in the person of Godlieb Seide the Russian immigrant who arrived at Quebec on the 17th November, 1910, was found to be a cholera carrier, and was still under observation as such at the Quarantine Station of Grosse Isle in the River St. Lawrence when I submitted my last annual report a year ago to-day. He continued to give positive indications during April last, and it was only in May that the bacteriological tests gave negative results. He therefore remained a cholera carrier for at least five months.

Emigrants from Italy are bacteriologically examined by medical officers of the Italian Government for the presence of cholera carriers before embarkation. Out of a total of 9,557 such examinations made, 40 carriers were found at Naples, and one at Palermo. A point of interest in connection with one case of cholera reported in Manila is that of seven contacts, all upon examination proved to be cholera carriers and none developed the clinical symptoms of the disease.

At the New York Quarantine from 20th July to 19th November, when the regulation was modified so as to apply only to immigrants arriving on cholera infected vessels, out of 26,455 passengers bacteriologically examined by the ten or more bacteriological assistants, twenty-six proved to be cholera carriers.

The actual cases reported from the United States during last summer are thus given in the Public Health Reports of the United States Public Health and Marine Hospital service:—

Places.	Date.	Cases.	Deaths.	Remarks.
Massachusetts :				
Boston	July 20	1	1	Removed to quarantine station at Gallups Island.
New York :				
Auburn	June 30-July 1	1	1	From steamship Duca degli Abruzzi, from Genoa and Naples.
Brooklyn	June 30-July 4	1	1	From steamship Duca degli Abruzzi. Removed to quarantine.
New York City	July 19-22	1	.....	Removed to quarantine.
New York quarantine	June 5-Aug. 19	18	13	Case June 5-July 18 from steamship Europa, from Genoa and Naples. Case July 11 from steamship Carpathia, from Trieste, Fiume, and Italian ports. 5 cases June 18-July 21 among passengers from steamship Duca degli Abruzzi. 9 cases July 12-31 among passengers from steamship Moltke, from Genoa, Naples, and Palermo. 1 case from steamship Konig Albert, from Genoa, Naples, Palermo, and Gibraltar. 1 case Aug. 16 from steamship Re d'Italia.
Staten Island	July 14-15	1	.....	Removed to quarantine.

No case of cholera nor cholera carrier was detected upon arrival at New York subsequent to August 18, 1911; but the United States Government kept on officers of the Public Health and Marine Hospital service at the principal foreign ports, and continued the bacteriological examination of immigrants for the detection of cholera carriers.

The method employed included the administration to the immigrant of a saline purge; the inoculation of a peptone tube with a specimen of stool; the incubation of this tube for six hours; the examination of smears made from the surface culture of the peptone tube, which smears are stained with carbol-fuchsin; if curved organisms are found subcultures in peptone and plates are made on ordinary nutrient agar neutral to phenolphthalein; colonies which have the characteristics of cholera colonies are next examined with reference to the quantitative agglutinating power of a specific cholera serum. Working with this method, ten bacteriologists examined 1,000 specimens in a single day and the complete examination of 1,200 stools was concluded within 48 hours. The immigrants from infected districts had been examined bacteriologically before leaving Italy so that the chances of finding carriers were small. Quite a number of vibrios were isolated, but none agglutinated with cholera serum, although some were morphologically indistinguishable from true cholera vibrios.

The bacillus carrier is an individual who may harbour cholera vibrios in his intestines and yet exhibit no signs of the disease. McLaughlin states that he has never known a bacillus carrier to harbour cholera vibrios for longer than 20 days, and that the great majority lose their vibrios in less than 10 days. Other authorities, however, give greater periods of longest duration. Rommelære gives 47 days, Kolle 48, Donitz 49, and Bürgers in February, 1910, reported a case in which the vibrios were still present up to 69 days. McLaughlin found six to seven per cent of carriers among healthy individuals living in the infected neighbourhoods of Manila. When cases are few in number, so called sporadic cases, hundreds and even thousands may be examined before the first carrier is found. The presence of bacillus carriers illustrates how Quarantines may be passed and an apparently inexplicable outbreak may take place. The danger from a bacillus carrier obviously depends upon his personal habits and the sanitary condition of the community in which he finds himself.

Our Russian patient who remained a carrier all through the Winter of 1910-11 at least five months excels all these quoted periods, as a cholera carrier. Because of the development of a case of cholera after the patient had been detained in Quarantine for five days, it has been decided that it will be necessary to lengthen the period of detention to ten days. The patient in this case arrived in New York on the Italian steamer *Duca degli Abruzzi,* and after the usual detention was allowed to proceed to Brooklyn. Four days later she was taken ill with symptoms of cholera, and was removed to the Quarantine hospital, where she died.

Cholera is due to the comma bacillus, and is taken through the mouth in water, food, or from the fingers, in almost exactly the same way as is typhoid fever. There is no danger from this disease if the same precautions are taken which should be taken in an epidemic of typhoid fever. Cholera has an incubation period of about five days, although it seems that occasionally the invasion may run from ten to twelve days. During the stage of invasion, there is commonly slight diarrhoea, colicky pains, headache, mental depression, and sometimes nausea and vomiting. The disease may terminate without further progress, but generally collapse and death or collapse and re-action supervene. In a few words, when the stage of collapse is entered upon the ordinary loosening of the bowels is suddenly succeeded by frequent copious stools, which lose their fecal character and become liquid or 'rice-water' discharges, generally passing without pain. Sometimes, however, with intense suffering. Then severe and persistent vomiting, thirst is excessive, tongue is furred and dry. We then note painful cramps in the legs and feet. Patient becomes rapidly

exhausted or collapsed. The skin is soft, shrivelled and wet. The lips and finger tips become blue, the face is gray, the eyeballs recede and cheeks become sunken. The temperature taken by the rectum may reach one hundred and four (104), but by axillary or mouth the temperature, however, *may be considerably below normal.* This is a very important point that should be remembered by every physician. Pulse becomes exceedingly feeble and imperceptible at the wrist. There may be stupor or coma, and scanty urine. It is seldom that this stage continues more than two days, and may last only a few hours. If death does not take place during collapse, you have the stage of reaction, when the skin becomes warmer, the flow of urine, which has previously been very scanty or even suppressed and albuminous, is re-established. Vomiting ceases, stools become less frequent and more fecal in character, pulse strengthens, the fever is gone and convalescense is usually at hand; although relapses occur the same as in typhoid fever.

The disease most likely to be mistaken for cholera is cholera morbus. Cholera morbus in a severe form has been mistaken for cholera a great many times, but now a positive diagnosis is entirely possible by the microscope, showing the presence or absence of comma bacillus. Some poisons produce symptoms similar to cholera. They can be detected by the microscope or by chemical tests of the stomach contents. The mortality varies in different epidemics, reaching from twenty to eighty (20 to 80) per cent, but the prognosis at all times must be very guarded.

In the first place the fact should be kept clearly in mind that the cholera spirillum is produced only in the intestinal tract of the patient. It leaves the sick or infected person only in the stools and the vomited matter. It is not present in the urine, expired air, nor in the secretions of the mouth and nose unless vomiting has occurred.

The second fact to remember is that cholera can be spread only by the transportation of particles from the infectious stools or vomited matter into the mouths and intestinal tracts of other persons. The ways in which this infectious matter may find its way to the alimentary canals of other persons are the following:—

(*a*) The infection may be carried to other persons by food which has been handled by persons who are more or less sick with cholera, or by persons who are not sick, but are merely infection carriers.

(*b*) Food may likewise be infected by the fingers of persons who have attended other persons sick with cholera.

(*c*) Persons may infect themseves by carrying their fingers to their lips after they have attended to the wants of the sick or have handled the bed or clothing of cholera patients or other infectious things, or who have visited toilet rooms infected with cholera discharges.

(*d*) Cups or spoons or other eating utensils used by the sick may serve as the agents of transmission.

(*e*) Flies having access to the sick room or to infected privy vaults or to other sources of infection may subsequently infect milk, bread, or other food supplies.

(*f*) Wells, springs, cisterns and public or other water supplies may serve as media of infection after they, directly or indirectly, have received any of the infectious matter from cholera discharges.

(*g*) Low growing vegetables from infected ground, eaten raw, may become the media of transmission.

Owing to the threatening of cholera from Italy the following ministerial order was issued:—

SESSIONAL PAPER No. 15

CIRCULAR TO QUARANTINE OFFICERS, THE COMMISSIONER OF CUSTOMS, SHIP OWNERS, AGENTS, AND OTHERS CONCERNED.

OFFICE OF THE DIRECTOR-GENERAL OF PUBLIC HEALTH,
OTTAWA, CANADA, July 27, 1911.

SIR *or* SIRS,—I am directed by the Honourable the Minister of Agriculture to inform you that, in order to diminish the danger of the introduction of Asiatic cholera into this country, he has issued the following orders:

All steerage passengers arriving at ports in Canada from ports or places infected with cholera shall be subject to bacteriological examination at the quarantine station of the port and shall not be permitted to pass such station or to make customs entry, until it has been determined by such examination that they are not cholera-bacillus carriers. This regulation shall apply until further notice to steerage passengers from Italy coming directly or via intermediate ports.

For all cholera contacts arriving on vessels upon which cholera has occurred, the period of detention under quarantine observation shall be 10 days, unless after 5 days' detention they are found not to be cholera-bacillus carriers.

Your obedient servant,

F. MONTIZAMBERT,
Director General of Public Health.

This remained in full force until the improvement in the cholera situation abroad in November last. It was then modified to apply only to immigrants on infected vessels. Special bacteriologists were appointed at the ports of arrival, the quarantine stations at Halifax, St. John and Quebec.

In the carrying out of the bacteriological examinations under the above cited circular two cholera carriers were detected at Grosse Isle, the Quarantine Station in the River St. Lawrence below Quebec. These with Godlieb Seide already referred to as discharged at the end of May make three cholera carriers at that station this season.

The second case was one of the Italian steerage passengers arriving by the SS. *Lake Erie,* on August 7, with 32 other passengers of the same nationality. One of these 33—who were, of course, all examined—named Vacchero Guiseppe, was found to be a cholera carrier. He was discharged cured on August 26th.

The third was a sailor on the SS. *Grampian.* The vessel arrived on August 27th. This man was English. He had been at Novorrossisk, a port on the Black Sea, seven or eight weeks before joining the *Grampian* at Glasgow. He had a history of a slight attack of diarrhœa after leaving Glasgow, but professed himself perfectly well. Bacteriological examination, however, proved him to be a cholera carrier. Under proper treatment he was able to be discharged cured on the 16th September.

Italy has been declared free from cholera since the 31st of December.

This disease prevailed during the year in the other countries mentioned above, but the threatening from the epidemic in Italy was the gravest upon either Atlantic or Pacific coast.

I dwelt in my last annual report upon the new sanitary problems introduced by the recent recognition of cholera carriers. With reference to the treatment of Asiatic cholera, I here insert an extract from a paper published in the *British Medical Journal* in November last by Leonard Rogers, M.D., Major I.M.S.:—

'It is impossible, as it is unnecessary, in such a paper as this, to give a complete account of all the details of the system of treating cholera which I have worked out during the last few years in Calcutta, as they are fully recorded in my recently published work on the disease, while a summary appeared in a paper in the *British Medical Journal.*

PATHOLOGICAL PRINCIPLES.

'It will, however, be advisable briefly to recapitulate the principles on which it is based, so as to allow of what I have to say regarding my recent very instructive experience of cholera among Europeans at Palermo being more readily followed.

The Blood Changes in Cholera as a Scientific Basis for its Treatment.

'In the first place my researches have shown that in the collapse stage of cholera, from one-half to two-thirds, or even more, of the fluid of the serum has been lost to the system, while in the most severe cases a still greater proportion of the chlorides may be lost, and the serum may even be hæmolyzed. These observations indicate the necessity of rapidly replacing the lost salts as well as the lost fluid, and of raising the salts in the blood somewhat above the normal point, so that the osmotic currents will tend to cause fluid to run into the blood rather than out of it, and thus the diarrhœa will be checked, instead of increased, as it is by the use of normal salines. For this purpose I use the following hypertonic saline solution:

Sodium chloride	120 grains
Potassium chloride	6 "
Calcium chloride	4 "
Aqua	ad 1 pint

As this formula contains 1·35 per cent of sodium chloride it is twice as strong as formerly used as normal saline, and half as strong again as the amount of salts now given as the normal amount by physiologists. The last two chlorides are added to make the proportion of the three approximate to Ringer's solution, which, when perfused through an animal's heart, will keep it beating very much longer than sodium chloride alone. Messrs. Parke Davis make hypertonic tablets of the above composition such that four to one pint make my hypertonic solution, while three in the same amount make an approximately normal saline. I used them with marked success at Palermo. I have, however, used 2 drachms to the pint of sodium chloride alone in very many cases, with successful results. I may take this opportunity of pointing out that the solution advised for intravenous injection in the article on cholera in the last edition of Allbutt's *System of Medicine,* consisting of 0·4 per cent sodium chloride and 0·2 per cent sodium carbonate, is dangerously hypotonic; in fact, I found it hæmolyzed a little of my own blood nearly completely in about two hours, so that its use in large quantities would probably have most disastrous consequences.

Blood Pressure and Specific Gravity Estimations as a Guide to Transfusions in Cholera.

'The degree of collapse may be accurately measured by taking the blood pressure with one of the numerous modifications of the Riva-Rocci mercury manometer. Observations on several hundred cases of cholera have shown that if the blood pressure has fallen to 70 mm. or less in natives of India, or to 80 mm. or less in Europeans—which means a serious degree of collapse—it is necessary to give intravenous injections, but if above these points, saline injections are readily absorbed when given subcutaneously as hypertonic solutions, or by the rectum as isotonic ones. Of even greater value is the estimation of the specific gravity of the blood by means of a series of twelve small bottles of glycerine and water of each two degrees from 1048, 1050, &c., up to 1070. A small drop of blood from the finger is blown gently from a capillary tube into the middle of a bottle, and if it sinks it is heavier than the solution, and a higher bottle is tried until it floats for a few seconds, which is the point required. If it sinks in one and rises in the next, the point is between the two. This estimation can be easily made by the bedside in two minutes, and it furnishes invaluable information as to the degree of concentration of the blood, and the necessity for an intravenous

injection, as well as an indication of the quantity required. The normal specific gravity being about 1056, if it is raised to 1063 or over it is safe to inject intravenously 4 pints in an adult male, and 3½ pints in a female. If the blood is very greatly concentrated, as shown by a specific gravity of from 1066 to 1070 or over, as much as 5 or 6 pints may be used, the last one or two being given slowly. The rate of injection can be readily controlled by means of the graduated glass bulb and stopcock cannula made for me by Messrs. Down Brothers. The fluid may be run in at the rate of 4 oz. per minute until a full pulse has returned, and then more slowly, especially if there is headache or oppression of the chest. It is advisable to dilute the blood to several points below the normal specific gravity, so as to allow a reserve of fluid for any further diarrhœa and for excretion through the kidneys, whereby toxins will be removel from the blood. The latter effect will be greatly facilitated by the fully normal blood pressure which will usually be obtained by the injection of the large quantities advised above. In addition to the intravenous injections, whenever the blood pressure falls to 80 mm. or less in a European, half to one pint of normal saline is also injected high up into the rectum every two or four hours in all cases to keep the blood fully diluted. and this measure is continued until at least 2 pints of urine are passed in the twenty-four hours.

Control of the Temperature Reaction.

'There is always a rise of temperature in the reaction stage of cholera, even when no salines have been used, and older Anglo-Indian writers regard this as the most dangerous stage of the disease. After an intravenous injection a similar marked febrile reaction occurs, often accompanied by a rigor, and it may sometimes run on into a dangerous hyperpyrexia, if not detected in time, and controlled by cold sponging and iced water rectal injections. A temperature of from 101° F. to 103° F. is a good sign, and if it rises to 104° F. or over, it should at once be reduced by the above measures. I have observed that dangerously high reactions occur most during hot damp weather, and especially in patients whose rectal temperatures were above normal at the time of the injection, although the surface heat may have been much below normal. In such cass the salt solution should be injected at below blood heat. Instances in which 4 pints of hypertonic solution were successfully given intravenously at a temperature of only 86° F. in patients whose rectal temperatures were 105° F. and 106° F. are given in my book.

The Prevention of Uræmia.

'The greatest danger after recovery from the collapse stage of cholera is the continued deficiency of the renal secretion, terminating in fatal uræmia and toxæmia. I have shown experimentally that this is due to renal stasis from continued subnormal blood pressure and concentration of the blood, which can be readily detected by blood pressure and specific gravity estimations two or three days before the onset of grave symptoms. Further, provided the kidneys were previously healthy, and the patient is not very old, the onset of uræmia may nearly always be prevented by diluting the blood to at least the normal point by isotonic salines, either subcutaneously or intravenously at a slow rate; and by the use of blood pressure raising drugs, such as digitalin, strophanthin, caffeine, and the vaso-constrictors, adrenalin and pituitrin. A number of illustrative cases are given in my book, so I need only mention here that in Calcutta the deaths from uræmia have been reduced by these methods to one-half their former numbers, and that too in spite of so many grave cases of cholera being tided over the collapse stage by hypertonic injections intravenously to face the dangers of later failure of the renal secretion.

Permanganates Internally to Destroy the Cholera Toxins in the Bowel.

'Although a great reduction in the mortality of cholera resulted from the use of hypertonic salines, yet some of the more severe cases died of toxæmia after being rescued from the dangers of collapse. It thus became clear to me that any further progress must depend on the destruction of the toxins in the body. In the absence of any specific serum of proved potency, I experimented to see if the toxins are readily destroyed by any substance which could be safely introduced into the gastro-intestinal tract in sufficient quantity to be likely to be of service, for as the cholera organisms are practically limited to the interior of the bowel, the toxins must be elaborated there, and absorbed into the blood. As bacterial poisons are mostly albumoses and closely allied unstable albuminous compounds, I tested the action of oxidizing agents, such as I had previously shown readily destroy all kinds of snake venoms, which are also albumoses. I found that cholera toxins are rapidly rendered completely inert by the action of permanganates, so I commenced giving these drugs in the following ways. A solution of calcium permanganate (which is somewhat less astringent than the potassium salt and at the same time stronger, as it is divalent) is given to drink *ad lib.* in a solution of 6 grains or more to the pint. It is usually advisable to dilute it further at first until the patient gets accustomed to the taste, and then gradually increase it as much as possible. In addition, the potassium salt is given in pills, being more convenient for this purpose, as it is much less hygroscopic than the calcium one:

Potassium permanganate..	2 grains
Kaolin..	q.s.

Make a pill and coat with salol or keratin, so that it will pass through the stomach and dissolve in the small intestine, where the action is desired. Two pills are given every quarter of an hour for the first three hours, and then two every half hour until the stools become green and less copious, which usually occurs within about twelve hours. The pills are then discontinued, but a course of eight pills is given at the beginning of the second and third days under treatment, to prevent relapses. In children smaller amounts must be given. Any pills which are vomited are replaced by others.

RESULTS OBTAINED IN INDIA.

Such is a brief outline of my methods, and I venture to claim that they amount to a complete system of treatment, based on scientific investigations, and affording means of accurately estimating the exact condition of the patient at any stage of the disease and for correctly meeting the indications furnished by the blood pressure and specific gravity estimations. The results obtained during the last four years in India may be summarized by saying that by the use of the hypertonic saline solution intravenously the death-rate in almost 300 cases, during two years, was reduced to 32·6 per cent from the previous rate in the same hospital during eleven years of 59·6 per cent. Further, during a complete year, with the addition of the permanganates internally, the death-rate was further reduced to 23 per cent. Moreover, I have been informed by Major Megaw, I.M.S., that this last result has been well maintained during the present year; while Captain Rutherford, I.M.S., in an epidemic in the Central Provinces in 1910, also obtained 77 per cent of recoveries, his death-rate being little more than one-third of that of cases in the same outbreak treated by other methods.'

Mr. H. D. Pant, L.M.S., (Lucknow, India), writing with reference to the internal administration of potassium permanganate in the treatment of Asiatic cholera, says that he called attention to the use of this drug, which he has employed for seventeen years, in a discussion which followed the reading of a paper on the treatment of

Asiatic cholera by Major Leonard Rogers at the Bombay Medical Congress in 1909. He adds the following quotation from the transactions on the congress: 'Hypodermic injections of camphor, rectal injection of saline solution, and teaspoonful doses every quarter or half an hour of a solution of permanganate of potash, gr. ½ to oz., are my sheet anchors during collapse. What effect the permanganate has, and how I came to adopt it, I am unable to explain. Suffice it to say that the use of this drug has satisfied me and my patients by giving force to the wavering and flickering pulse.'

A sketch map contained in the last monthly *Bulletin* of the International Office of Public Hygiene in Paris shows the prevalence of cholera in the Mediterranean basin and adjacent countries during 1911. In May the disease existed in epidemic form in three districts—two in Asia Minor, one near the southern Persian frontier, and another north of Erzeroum, extending as far as the southern shore of the Black Sea, and a third to the east of the Volga, in the lower part of its course. In June it had extended over a large area of country in Asia Minor, between Smyrna and the Sea of Marmora, as well as on the Persian frontier to the south of the districts infected in May. In July it had extended to both sides of the Volga as far as its mouth in the Caspian Sea, and to Sicily and the eastern parts of Southern Italy. In August the southern part of Sardinia was infected, as well as districts both in North Italy and on the eastern side of the southern part of the peninsula. It had also extended in Asia Minor to the whole of the southern shore of the Black Sea and of the Sea of Marmora and to the Aegean coast. In September Tunis and Tripoli had become infected as well as the northern part of Sardinia and several additional areas in the north of Italy. In August the disease had extended also throughout Macedonia as well as to the left bank of the Danube, from whence it spread to the right bank in September; the extent of country infected on the left bank increased during October, November, and December. The history of last year gives colour to the opinion which has been expressed by some authorities that the disease is again moving in an easterly and northerly direction, and it will be necessary for this country stringently to enforce the customary precautions during the approaching spring and summer.

Bubonic Plague.—This disease has prevailed during the year in the following countries: Algeria, Arabia, Azores, Brazil, British East Africa, British South Africa, Chile, China, Dutch East Indies, Ecuador, Egypt, German East Africa, Hawaii, India, Indo-China, Japan, Java, Mauritius, New Caledonia, Peru, Philippine Islands, Russia, Siam, Straits Settlement, Trindad, Turkey in Asia, and Venezuela.

In my last annual report I spoke of the four deaths from Pneumonic Plague that had occurred in Suffolk, England, in the autumn of 1910. In August last a consecutive account of the occurrence and of the epidemic of plague in rodents was issued in a report of the local Government Board. In an introduction to the report Dr. Newsholme states that after a knowledge of the circumstances had been brought before the Board it was realized that grave significance attached to the presence of a focus of plague in rodents, and that no efforts should be spared in coping with the situation. Three inspectors of the Board—the late Dr. Bulstrode, and his colleagues, Drs. Fletcher and Reece—were engaged during several months in investigating the outbreak, and in warning and stimulating to activity the local authorities and their officers in the infected area. Arrangements were made for the destruction of rats upon an extensive scale, and for the examination of these and other rodents. The examinations were carried out by Drs. Petrie and Macalister of the Lister Institute at the Public Health Laboratory of the Ipswich Corporation. After giving an account of the illness of the four persons who died in September, as reported upon by Dr. Sleigh and Dr. Brown in the *British Medical Journal* of November 12, 1910, Dr. Bulstrode discusses the opportunities for the introduction of plague into East Suffolk by means of rats. The possibilities of the introduction being due indirectly to cargoes of grain, or to the London manure, which is dispatched either by rail or barge to the eastern counties, are considered by him in some detail. It appears that

very little of the latter reaches Suffolk, and for this and other reasons he seems to be of opinion, though he does not definitely say so, that the original centre of diffusion was Ipswich, and this mainly by reason of the very large grain trade carried on at the Ipswich Docks, and by the opportunities which exist at the docks for the access of rats from the ships to the shore. Of considerable importance are the suggestions which he makes as to future precautions. He points out that practically all the outbreaks of the present day are found to be preceded, if diligent search be made, by mortality amongst rats or other rodents, and where such mortality obtains the risk of the human population being involved is considerable. Arrangements should accordingly be made by every sanitary authority for receiving the earliest intimation of deaths among rodents and for sending to the Health Boards specimens of such animals for bacteriological examination. It is conceiveable, he admits, that a large number of rats in the invaded localities may now be relatively immune from plague, but as a young rat population arises there will grow up a large unprotected rat population, prone to die off if, and when, the rat epizootic appears. Consequently persistence in rat destruction is called for. Further recommendations are that immediate medical advice should be sought whenever suspicious symptoms occur; that a supply of Haffkine's plague prophylactic should be held in readiness by medical officers of health; that isolation accommodation should be provided by sanitary authorities; and that, with regard to general sanitary measures, 'the greatest attention should be paid to the poorest, most insanitary, overcrowded, and district property, since it is on premises of this description that plague is most likely to occur, and the pneumonic variety of the disease is most easily spread.'

A case of plague was reported at Shotley, Suffolk, on November 2 last, a sailor. It is thought he derived the disease from a rabbit.

A case of plague was reported in Glasgow in June last. Cases occurred in the United States in the State of California, in Contra Casta County on 21st July, in Oakland on August 9, and in San Joaquin County on 18th September. Infected rats were found in the city of Seattle up to 21st September last, and infected squirrels in California up to 27th October last. The following record of plague infection in the United States is from the Public Health Reports of the United States Public Health and Marine Hospital service under date the 29th instant.

Places.	Date of last case of human plague.	Date of last case of rat plague.	Date of last case of squirrel plague.	Total number of rodents found infected since May, 1907.
California :				
Cities—				
San Francisco	Jan. 30, 1908.	Oct. 23, 1908.	None	398 rats.
Oakland	Aug. 9, 1911.	Dec. 1, 1908.	"	126 "
Berkeley	" 27, 1907.	None	"	None.
Los Angeles	" 11, 1908.	"	Aug. 21, 1908.	1 squirrel.
Counties—				
Alameda (exclusive of Oakland and Berkeley).	Sept. 26, 1909.	Wood rat, Oct. 17, 1909.	Oct. 9, 1911.	114 squirrels and 1 woodrat
Contra Costa	July 21, 1911.	None	Sept. 29, 1911.	364 squirrels.
Fresno	None.	"	Oct. 27, 1911.	1 "
Merced	"	"	July 13, 1911.	5 "
Monterey	"	"	Aug. 6, 1911.	5 "
San Benito	June 5, 1910.	"	June 8, 1911.	22 "
San Joaquin	Sept. 18, 1911.	"	Aug. 26, 1911.	18 "
San Luis Obispo	None	"	Jan. 29, 1910.	1 "
Santa Clara	Aug. 23, 1910.	"	Oct. 5, 1910.	23 "
Santa Cruz	None	"	May 17, 1910.	3 "
Stanislaus	"	"	June 2, 1911.	13 "
Washington :				
City—				
Seattle	Oct. 30, 1907.	Sept. 21, 1911.	None	25 rats.

Between April 24 and August 21, 1911, there were reported in Hong Kong 255 cases of plague and 194 deaths from the disease. The plague was most severe in June, when during the second, third and fourth weeks the cases numbered 38, 30, and 25 respectively, and the dates during the corresponding weeks amounted to 26, 23, and 8.

It is again showing itself this spring. In the week ending the 2nd instant 8 cases with 6 deaths were reported. In the week ending the 9th instant 12 cases with 12 deaths, in the week ending the 16th instant 10 cases with 9 deaths, and in the week ending the 23rd, 20 cases and 18 deaths. In Japan, at Kobe, a few cases of plague have occurred during 1911, but nowhere has there been a severe outbreak. In Formosa, however, the prevalence of plague has been severe; between April 2nd and 15th 31 cases with 24 deaths were recorded.

During the first six months of 1911, 604,634 persons died of plague in India. The following table gives also the returns for July:—

Deaths during 1911.	Bombay Presidency.	Bengal.	United Provinces.	Punjab.	Rajputana and Ajmer Merawa.	Kashmir.	Coorg.	Northwest frontier Province.	Central Provinces.	Central India.	Hyderabad Provinces.	Madras Presidency.	Mysore State.	Eastern Bengal and Assam.	Burma.
January	6,364	8,446	39,794	8,028	2,647	43	1	19	5,067	2,404	1,032	1,594	1,386	0	1,096
February	6,703	11,863	43,508	13,064	3,326	27	0	8	5,541	924	784	1,050	656	0	1,044
March	6,865	21,867	95,884	27,166	5,012	73	2	31	5,245	2,115	699	784	458	5	866
April	6,240	13,091	81,924	57,625	4,748	294	0	84	1,412	840	250	229	252	0	496
May	2,474	2,944	24,842	48,292	1,672	456	0	88	96	33	8	84	230	0	505
June	1,463	364	1,365	16,909	389	193	0	12	1	3	0	185	387	0	651
Total half-year	28,109	58,515	281,317	171,084	17,794	986	3	242	17,355	6,319	2,773	3,828	3,369	5	3,728
July	3,406	350	162	2,195	19	0	0	0	51	12	111	699	1,387	0	595
Total (7 months)	31,515	58,865	287,479	173,279	17,813	986	3	242	17,406	6,331	2,887	4,527	4,756	5	4,323

The International Plague Conference called together by the Chinese government after the outbreak of the plague in serious proportions in that country, has made to that government an interim report which includes a summary of the evidence collected by the commission and a series of resolutions and recommendations approved by the conference; but this report will not be made public until the full report of the conference is issued. From the news accounts of the discussions already published, however, the work and the conclusions of the conference may be briefly summarized.

No types of plague were found other than the pneumonic or the combined pneumonic and septicemic, and this is a point of great interest in this epidemic. The other great epidemics have been mostly of the bubonic form. The theory that the plague originated from infected tarabagans, a species of marmot, a fur-bearing animal of the squirrel family, has been accepted as probably the correct one. That this animal is extremely susceptible to plague was shown by the American delegates. It has also been found that this animal suffers from a form of subacute or chronic plague, and this probably explains why the plague is endemic in Northern China. Neither rats nor other animals besides the tarabagan were found to be largely affected with the plague, only one rat having been found to be infected in upward of 30,000 rodents examined by the Chinese and Japanese. One dog was said to have died from plague at Dalny, and there were circumstantial accounts of mules having been infected. The plague promptly subsided when attacked in earnest and the chief factor in its eradication appears to have been the drastic preventive measures taken by the Russian, Japanese and Chinese authorities, although climatic and other natural influences may have contributed to this result. That there was no decrease in the virulence of the bacillus during the later stages of the epidemic seems to have been conclusively demonstrated. Even in the small villages and hamlets the inhabitants were frightened by the fatality of the disease into taking crude but effectual precautions.

It was almost conclusively demonstrated also, that the disease was introduced into every new centre by the arrival of persons actually suffering from plague or incubating the disease. That pneumonic plague can be carried by clothing or merchandise or by vermin was not proved and the direct human factor in its transmission seemed to be the chief one. Experiments undertaken by the American and Japanese delegates seemed to prove conclusively that the breath of the sufferer was not infective apart from particles of sputum expelled by coughing or possibly by forcible speaking. The sputum, however, was shown to be infective as long as it remained moist or frozen, and it is believed that dust can carry infection only by acting as the medium for small particles of moist or frozen sputum, and houses are probably not infective apart from the presence of such infective sputum. It has been determined that the incubation period varies from two to seven days, but is usually three to five days. The pulse was regarded by some as the earliest diagnostic sign; by others, including the Russian delegate, Zabolotny, the temperature was relied on. The absence of marked physical signs in the chest during the early stages was notable, and rendered diagnosis difficult. Less than five recoveries were recorded.

The value of plague vaccines and serums during a pneumonic epidemic was thought to be doubtful, although this feature developed considerable difference of opinion among the delegates. It was suggested that attenuated living cultures of the bacillus might be used for protective inoculation, but this was condemned by some as being too dangerous and therefore unjustifiable.

Two facts seem to stand out prominently from the work of the conference, and these are that the human host is the most important factor in the spread of the infection, and that rather close contact is a necessary element. This is in line with the knowledge that is now becoming more clearly established in regard to other epidemic and infectious diseases, and is the most important point to be taken into

consideration in dealing effectually with them. Even the possibility of immune carriers was demonstrated in at least one instance in this epidemic, and this is in line also with our growing knowledge of the infections.

In connection with the present perfection of laboratory methods in the study of diseases, especially of the infectious diseases, the conference plan of reaching results in a large way in diseases that menace large populations is a marvelously quick and efficient one. This conference, along with the other important international conferences of recent years, is a distinct step forward in the control or elimination of deadly world-epidemics.

Yersin's anti-plague serum is still imported monthly from the Lister Institute of Preventative Medicine in London, England, and held ready to be rushed to any part of the Dominion should occasion arise. With the proposed Canadian Biological Laboratories all such preventive and remedial agents will doubtless be made here.

Leprosy.—The *New York Medical Record* in an article in its issue of the 16th instant on the 'Bacteriological Problems of Leprosy', says: It is now over forty years since Hansen demonstrated the presence of a bacillus in the affected tissues of the leper. Since that time the bacteriology of leprosy has constantly engaged the attention of all investigators of the disease, but it is only within comparatively recent years that any substantial additions have been made to our knowledge of this phase of the subject.

'In the *United States Naval Bulletin* for January, 1912, Passed Assistant Surgeon Crow, of the Navy, gives an account of his work on the search for the microorganism in the general circulation of lepers. Out of a total of twenty-four inmates of the leper colony in Guam, he demonstrated the presence of the bacillus in the blood of all but three. His technique was carefully perfected, and it seems that all necessary precautions were taken to exclude contamination by substances which might contain other acid-fast bacilli. He concludes that if sufficient care and diligence be used, the lepra bacilli may be found circulating in the blood in at least 80 per cent of cases. The constant presence of the bacillus in the leprous lesions has heretofore been regarded as the chief argument in favour of its being the cause of the disease. The work of Crow adds another link to the chain of evidence, and although, in this particular affection Koch's four postulates still remain uncompleted, there is, nevertheless, no reasonable doubt of the etiological connection between the bacillus and the lesions in which it is found.

The inability to propagate the bacillus artificially, either in laboratory animals or in culture media, has in the past presented the greatest obstacle to the final proof of this connection. Likewise, without this knowledge, intelligent studies in specific therapy have been impossible, and investigation of the manner of transmission necessarily limited to the keeping of clinical records. The work of Currie, Clegg, and Hollman of the leprosy investigation station in Hawaii seems now to be far enough advanced to warrant the conclusion that it will not be long before some truly specific treatment may be forthcoming. In an effort either to confirm or to disprove the statement of Clegg, who, as a result of independent work in the Philippines in 1909, claimed that he had succeeded in isolating in pure culture the lepra bacillus, the investigators at the Hawaiian station commenced, in 1910, a series of experiments which have not only tended to corroborate the independent work of Clegg, but also to contribute substantially to our knowledge of immunity in this disease. By adding leprous material to agar on which the cholera spirillum and amebas were growing in symbiosis, they found that they were able to cultivate an acid-fast bacillus which was morphologically similar to that of leprosy *(Public Health Bulletin, No.* 47*)*. Furthermore they have been able to isolate this bacillus in pure culture and by serum tests have proven that it is not identical with other members of the same group, represented by the smegma bacillus, and the grass bacillus of Möeller.

'From the fact that the organism which they have isolated can be grown from leprous tissue, together with its morphological similarity to *B. lepræ* as originally found in such tissue, it seems fair to assume that the two are, in reality, identical. This opinion is still further confirmed by the Hawaiian investigators' studies in immunity *(Public Health Bulletin, No.* 50*)*. It had already been shown that the blood serum of lepers contains antibodies which, when combined with antigenic substances closely allied to those producing the Wassermann reaction, were capable of fixing the complement. Thus, Wechselmann and Meier were able to fix the complement by using syphilitic antigen and serum from leprous patients *(Deutsche medizinische Wochenschrift,* vol. 34, p. 1347*)*. The same result has been obtained by many other competent observers, and working along these lines the Hawaiian station investigators have been able to produce specific agglutinins for *B. lepræ,* by using the blood serum of a horse which had been injected with the cultivated lepra bacilli.

'Therefore the identification of the organism may be regarded as absolutely proved, and from the premises in the case one would seem safe in predicting that the near future will see the successful issue of the effort to find an efficient serum or vaccine against the ravages of the one disease which has always heretofore been regarded as heading the list of incurable chronic affections.'

In the Scientific Memoirs by Officers of the Medical and Sanitary Departments of the Government of India (*New Series,* No. 42, Calcutta, 1911, 9d.) Major E. R. Rost, I.M.S., and Captain T. S. B. Williams, M.B., I.M.S., describe their work on the leprosy bacillus. In 1909, Major Rost, with the assistance of Mr. Bansi Lal, isolated from three cases of nodular leprosy an acid-fast bacillus, which he was able to subculture, through successive generations, in pure growths possessing 'certain peculiar characteristics, resembling morphologically the bacillus of leprosy.' His culture medium consisted of '250 c.cm. of distilled volatile alkaloid of rotten fish, 250 c.cm. of weak Lemco broth without salt or peptone, and 50 c.cm. of milk.' Three days after tubes of this medium had been inoculated with leprous material, a slight stringy growth was visible at the bottom and revealed under the microscope acid-fast bacteria massed together in parallel arrangement. The author then found that in subcultures on nutrient agar and broth (without salt or peptone) a feebly acid-fast bacillus developed. Its acid-fastness was increased by growing in milk, and it was found that the degree of acid-fastness could be varied according to the fatty nature of the medium. Agar plate cultures were made, and these, three days after inoculation, 'showed discrete colonies about the size of a pin's head, opaque, orange-red, raised in the centre, humped and moist to the naked eye.' The organism is exceedingly pleomorphic. After forty-eight hours' growth its appearance is as in the nodules of a leper. But when the cultures are older, or when they are grown under unfavourable conditions of medium and temperature, 'degenerate forms are found which double or treble their usual length with a moniliform arrangement, and lose their acid-fastness. These break down after a few days into clumps of small acid-fast coccoid forms.' With the exception of minor differences, the characteristics of the cultures isolated from the three cases were the same. The cultures were tested experimentally upon guinea pigs, white rats, and rabbits by subcutaneous, cutaneous and intraperitoneal inoculation and by feeding; but all the results were negative. A monkey, after repeated injections with culture, developed clinical signs of the disease and showed nodules in which were found typical leprosy bacilli, but attempts to obtain a pure culture from the lesions proved unsuccessful. Major Rost has also utilized his cultures for the preparation of vaccines and has tried their effect upon volunteer cases in the leper asylum at Kemendine. He reports that 'of the ten cases in which this treatment has been adopted, two have now recovered; two are so much improved that apparently the remnants of the disease are very slight; and the remaining six have all improved in a remarkable manner.' Captain Williams reports that as a result of his work since the beginning of

1909 he has grown from five cases of leprosy, in circumstances which he considers preclude contamination, two apparently different organisms. Two of the cases occurred in Persia and three in Bombay. His later work has inclined him to the belief that the two organisms are really the same, but altered by environment. 'In ordinary broth,' he says, 'I have grown a streptothrix, somewhat similar to that described by Professor Deycke, while in other special media I have grown a 'bacillus' very similar to that grown by Major Rost in Rangoon. The 'bacillus' he regards as the bacillary form of the streptothrix. Captain Williams used as culture medium ordinary nutrient broth, which was inoculated from non-ulcerated lepromata. The tubes were kept at room temperature. During the period of incubation the broth remained absolutely clear, but after eight weeks 'small puff-ball growths appeared at the bottom of each tube, and gradually multiplied, growing upwards, and adhering to the side of the tube.' Microscopically, on staining by the Ziehl-Neelsen method, he found that the growths consisted of a non acid-fast streptothix, with masses of acid-fast bacilli lying amongst the meshes of the streptothrix. In subcultures, from the third onward, no acid-fast bacilli occurred. But under certain cultural conditions he was able to regain acid-fast forms, and, on the whole, the cultural reactions obtained on various differential media resembled fairly closely those obtained by Major Rost. Captain Williams is also trying vaccine treatment and seems to think that his results are encouraging.

A Report from British Guiana, recently laid on the table of the English House of Commons, brings up to date the record of the investigation of the value of nastin and benzoyl chloride which has been in progress at the Mahaica Leper Asylum in the colony in question for the past three years. The conclusions reached are not favourable to nastin, and only recommend benzoyl chloride as a palliative remedy. The investigator, Dr. E. P. Minett, Assistant Government Bacteriologist, concludes his report, which is remarkably succinct and yet adequately detailed, by indicating that so-called destruction of bacilli takes place in patients who are under treatment either by nastin or benzoyl, but does not appear to be hastened or otherwise influenced by either of them; it is a natural process which seems to accompany almost all cases of leprosy, and its activity varies both from time to time and also in different situations in the same patient. Cases of anæsthetic leprosy run a definite course, after which the disease seems to die out of itself, infectivity ceasing and cutaneous sensibility slowly returing. But these recoveries take place without any treatment whatever, and their rapidity is not apparently influenced either by nastin or benzoyl. Nodular cases do not tend to improve naturally, except in very rare instances, but the condition of these likewise is not affected appreciably by the drugs in question. On the other hand, benzoyl chloride is distinctly useful as a nasal spray or as a paint for ulcerating surfaces, since it quickly frees the discharges from bacilli; its regular use for this purpose is strongly recommended.

Dr. G. Armeur Hansen, head of the Leper Hospital at Bergen, Norway, and discoverer of the bacillus of Leprosy, died 12th February, 1912.

There are at this date in your Tracadie Lazaretto twenty-two patients, twelve males and ten females. Their ages range from eight to eighty. Eighteen are of French, two of English, one of Icelandic and one of Russian origin. One death occurred during the year, and three new cases were admitted.

Treatment with Nastin in addition to Chaulmoogra oil is being given a trial.

Your Leper Lazaretto at Darcy Island, B.C., has not been occupied by any leper during the last twelve months.

A Chinese lad, a patient in a Toronto hospital, was recently found to be leprous. As he had been less than three years in this country his deportation to his home in China came under the jurisdiction of the Immigration Branch of the Department of the Interior.

Smallpox.—The time should surely be past when it is necessary to make an argument as to the efficacy of vaccination to prevent smallpox. Still as there remain anti-vaccinationists and 'conscientious objectors' the well known truths have to be again brought forward from time to time. The State Board of Health of Maine issued in January last a comprehensive bulletin on smallpox and vaccination from which I shall borrow some statements: in support of the proposition that as vaccination advances smallpox recedes the bulletin states:—

With the advance of the practice of vaccination smallpox has receded. This has been true in every country in which vaccination has been introduced. The retrocession of smallpox has been in proportion to the care with which vaccination has been carried out and the degree of its approach to universality. This has been true whether the peoples were civilized or were lower in the social and civic scale. These conquests of smallpox have been made irrespective of whether the general conditions have been improved or have not. In some cases the mastery of the pestilence has been so sudden and compelling that all save those who prefer their voluntary sightlessness to clearness of vision might see that there is no logical explanation of the change other than the salutary influence of vaccination. The following recent instances of the victories of vaccination are presented:

Smallpox in Cuba under Spanish rule was one of the most fatal diseases. In Havana there were, in 1887-1888, 20,000 cases with 2,555 deaths. Vaccination introduced with the American occupation has been continued by the Cuban government through the central bureau of vaccination, whose report of 1903 showed 300,000 successful vaccinations and not a case of smallpox on the island.

Major Azel Ames, director of vaccination in Porto Rico, has told us about 'the absolute demonstration that comprehensive, compulsory vaccination, properly conducted, will alone certainly eradicate smallpox from any region or people.' Smallpox was endemic. It was somewhat prevalent in October, 1898, was epidemic in December of the same year, and it 'honeycombed' the island in January, 1899. In February there were 3,000 recent cases and the disease was spreading at a gallop. A systematic compulsory vaccination was begun in that month, and in four months 860,000 of the 960,000 inhabitants had been vaccinated. The work ceased and the disease disappeared.

According to one of the annual reports of Dr. V. G. Heiser, the chief of the Sanitary Department in the Philippine Islands in seventeen provinces there had been an annual mortality of 6,000 from smallpox among probably 25,000 or 30,000 cases in all; but in the twelve months following the completion of vaccination in these provinces there was not one death. Vaccination had been completed about a year before the report was written.

The few pieces of evidence presented under the preceding heading should go a long way in convincing normally working intellects but may not suffice for those who, for some time, have been steeped in the false doctrine that vaccination offers no protection against smallpox. To such as wish to be guided by the truth the following statements should be of interest:

In their book on the 'Acute Contagious Diseases' Welch and Schamberg say in regard to the protective power of vaccination:

'If it can be demonstrated that physicians and nurses in smallpox hospitals are protected by vaccination, this must be regarded as a crucial test. For if these persons, living in the same atmosphere with scores of hundreds of smallpox patients, breathing in their very exhalations, are enabled to escape the infection, it certainly should be possible for others much less exposed to acquire similar immunity.

'Experience shows that physicians, nurses and others, if recently successfully vaccinated, may live in smallpox hospitals with perfect safety. The immunity of employees (when properly revaccinated) is a uniform experience in practically all smallpox hospitals.

'Dr. Marson, physician to the Smallpox Hospital of London for many years, giving evidence in 1871, stated that during the preceding thirty-five years no nurse or servant at the hospital had been attacked with smallpox. Since that period one case only has occurred, and that in an unrevaccinated gardener. Thus, during a period of sixty years but one case of smallpox has occurred among hundreds of persons who were in the closest contact with the disease.

The immunity of revaccinated nurses and physicians against smallpox constitutes testimony in favour of the efficacy of vaccination which is irrefutable.'

Answering the question 'Are the antivaccinationists over converted' the bulletin continues:—

An English medical officer of health answers this question thus:

'The writer, many years ago, when in charge of the smallpox hospitals in the borough of Sunderland, had under his care a man who was a very strong antivaccinator. He was well known to the public, and was a leader among the labouring classes of the borough. His attack was comparatively mild, for, fortunately for him, he had been vaccinated when he was young, and consequently his attack was slight, and he soon became sufficiently convalescent to be able to observe the other patients in the ward in which he had been placed. It was not long before he commenced to talk about smallpox and vaccination, and also to note the different types of the disease that were under treatment in his ward. This led him to make inquiries as to the state of vaccination of these people, and soon he was enabled to say pretty positively, when new patients were brought into the ward, whether they had previously been vaccinated or not, with the result that before he left the institution he became a very confirmed believer in the power of vaccination. As he said: 'I cannot close my eyes to the fact that the disease in nearly every case in which the patient was unvaccinated was of a very virulent character, while among the vaccinated it was as a rule of a very mild type.' It is only by such an experience that one can ever hope to convert the antivaccinator, who, like every other 'anti,' is steeped in prejudice against his pet aversion.

'Another case is also of great, if melancholy interest. It is only one, but the first of many experiences which the medical officer of health could relate. In the early part of the year 1873 he entertained in his father's house one evening, at a time when smallpox was very prevalent, in the city of Cork, a number of medical students, together with a friend engaged in mercantile pursuits, and naturally the subject of vaccination was discussed. One of those present had recently obtained his medical qualifications, and he offered there and then to vaccinate the party. All accepted the offer with the exception of the gentleman named, who stated that he had never been vaccinated, because his father did not believe it was a preventative, and that it would annoy him very much if he were vaccinated then. Some nine or ten days later all the party went to the theatre together, and, sitting next to the writer, and three persons removed from the gentleman mentioned, was a woman, who without doubt had recently come from a bed of smallpox, for her face gave positive evidence that she had had a very bad attack. In seven or eight days the unvaccinated member of the party began to sicken, and within three weeks he was dead from malignant smallpox. At his funeral there followed a grief-stricken father, who within nine months was also laid beside his son, his heart broken by the knowledge of the fact, which he freely confessed, that his boy, who was a splendid type of muscular Christianity, would have then been living were it not for his folly.'

The Bulletin further quotes:—

Seven years ago the Department of Health of Chicago made the following declaration of their faith in vaccination:—

'First.—The true vaccination—repeated until it no longer 'takes'—*always* prevents smallpox. *Nothing else does.*

'Second.—That true vaccination—that is, vaccination properly done on a *clean* arm with pure lymph and kept perfectly *clean* and *unbroken* afterwards—never did and *never will* make a serious sore.

'Third.—That such a vaccination leaves a characteristic scar, unlike that from any other cause, which is recognizable during life, and is the *only* conclusive evidence of a successful vaccination.

'Fourth.—That no untoward results ever follow such vaccination; on the other hand thousands of lives are annually sacrificed through the neglect to vaccinate—a neglect begotten of *lack of knowledge.*'

As a supplement to their vaccination creed they state:—

'Not one of the 727 cases of smallpox discovered in Chicago within the last four years was found vaccinated as defined in the Vaccination Creed.

'Of the total number, 662 never had been vaccinated at all, though most of them claimed that they had. Examination of the arms proved that these attempts at vaccination were failures; there was no scar, and the patients finally admitted that the vaccinations when performed did not 'take.' A 'failure' is not a vaccination; therefore, these 662 cases had never been vaccinated.

'Of the remaining 65 cases, 56 had old, irregular, and doubtful scars, said to be the result of vaccination; but these were not characteristic; they were more like the scars from infected sores or wounds than those from vaccine. Only nine had typical (characteristic) scars; but these also were the results of vaccination made many years before and never repeated.

'In no single case of the 727 had the terms of the first article of the Vaccination Creed been complied with—vaccination had *not* been repeated until it would no longer 'take.' If it had been they could not have contracted smallpox.

'These 727 persons are examples of thousands of others who honestly believe they have been vaccinated, because they have had their arms scratched, something rubbed in, and a more or less painful sore has resulted. There is no operation so simple and so safe as vaccination when properly performed and cared for.'

Smallpox has presented itself at two of your Quarantine stations this year.

At the William Head station, B.C., the *Empress of India* and the *Protesilaus* brought the disease. And the *Princess Beatrice* of the coasting fleet of the Canadian Pacific S. S. Company was sent down by permission from Prince Rupert for disinfection and vaccination of the crew and 10 passengers, there having been a case of smallpox carried on the vessel between Prince Rupert and Queen Charlotte Islands.

In all three instances the disease was stamped out at the William Head Quarantine Station.

At the Grosse Isle Station in the River St. Lawrence six smallpox infected passenger steamships brought eight cases of the disease. The steamships *Dominion, Albania, Gothland, Corsican, Wittekind* and *Barcelona,* with an aggregate of 6,337 persons on board.

Here, as at William Head, the disease was stamped out at the Quarantine station.

Special temporary inspection for smallpox.—At the date of my last annual report owing to the prevalence of smallpox in neighbouring states to the south of the line special medical inspection of persons entering across the frontier was being carried out at North Portal, Saskatchewan, and at Fort Frances and Rainy River in Ontario. In consequence of the subsidence of the epidemic threatening you raised these temporary quarantine inspections on November 15th last.

In Prince Edward Island owing to the prevalance of smallpox in Nova Scotia, and New Brunswick, temporary quarantine inspection was being carried out at Georgetown at the date of my last annual report. This was supplemented on the 26th of

April, 1911, by the appointment of a special temporary medical inspector at the port of Summerside, and the enforcement of inspection at Charlottetown by your permanent quarantine officer there of all arrivals from the mainland, including those by the daily steamer from Pictou.

This special inspection was raised by you on the 18th of November last.

Typhus fever.—This disease so frequent amongst incoming immigrants in my early years in the public health service, and which I contracted in the discharge of my duty, is now rarely met with. It still is to be found in the crowded unsanitary parts of large cities and in Mexico, but not as formerly. Why it is I do not pretend to know, but the cerebral fever (typhus) which was the disease of crowded aggregations of persons a generation ago, under the titles of ship fever, jail fever, camp fever, and so on, has of late years been replaced under similar circumstances by the enteric fever (the wrongly named typhoid).

The *Medical Record* speaks of the similarity of mild typhus fever, and the so-called Brill's disease:

Those familiar with both diseases have for some time suspected that the symptom-complex so clearly described by Dr. Nathan E. Brill, which has become generally known as Brill's disease, was a mild form of typhus fever. From Brill's report it is apparent that he has recognized the similarity of the two diseases, for he says, 'in the case of an epidemic of typhus, in my opinion, it would be simply impossible to say that those cases which I have described were not mild typhus fever.' Nevertheless he refuses to admit the identity of the two diseases. Friedman, who had observed cases of typhus fever in Russia, laid special emphasis upon their similarity in a paper read before the New York Academy of Medicine in May, 1911. (*Medical Record,* September 16, 1911, p. 606). Louria of Brooklyn, in an article in the *Medical Record* of August 26, 1911, also notes the striking similarity of the two diseases, and quotes Goodall of London, who regards the two diseases as one and the same.

The recent findings of Anderson and Goldberger, which seem to show that the two diseases are identical, will, therefore, cause little surprise. These workers in experimenting with monkeys found that an attack of Brill's disease which they were able to produce in these animals by inoculation rendered the monkeys immune to the strain of typhus fever now prevailing in Mexico, and that the reverse was also true, namely, that an attack of Mexican typhus fever produced in monkeys an immunity to Brill's disease. This seems to indicate that the typus fever which has been prevailing in the plateau regions of Mexico, and locally is called 'tabardillo' is identical with the disease described by Brill. While the presumption is strong, it remains yet to be proven that the typhus fever of Mexico is the same as the typhus of Europe and Asia. This added information concerning a disease which had come to be recognized as a definite entity, but of which the etiology and relationship to other diseases were in doubt, has aroused much interest in New York city, where most, if not all, of the cases of Brill's disease have been reported. The disease is known to have been recognized, however in other large cities and very possibly greater numbers of cases will be encountered in the future and the occurrence of typhus fever in many large cities may be found to be not uncommon.

Russian physicians recognize a mild form of typhus in that country and say the type of the disease is so modified that the mortality is very low and instances of evident contagion are rare. Goodall asserts that a mild type of the disease is encountered among the Russian Jews in London, and many physicians practising among the same class of the community in this city believe that modified typhus fever exists here also. It would be strange if it did not, and the experiments of Anderson and Goldberger seem to show quite conclusively that it does.

The summary and conclusions laid down by recent observers are as follows:

1. The Rhesus monkey is susceptible to infection by inoculation with the blood from a case of 'Brill's disease.'

2. One attack of the disease in the monkey induces a definite immunity to a subsequent infection with virulent blood of the same strain.

3. Monkeys recovered from an infection with 'Brill's disease' have been found to be immune to a subsequent infection with virulent blood from a case of Mexican typhus fever.

4. Monkeys recovered from an infection with Mexican typhus fever have been found to be immune to a subsequent infection with 'Brill's disease.'

5. From the above results we conclude that the disease described by Brill is identical with the typhus of Europe, and inasmuch as the New York strain is undoubtedly of European origin, we may also conclude that the typhus of Europe and the tabardillo of Mexico are identical.

6. If this conclusion is correct, typhus fever has been present in New York city for a number of years and, according to verbal reports made to us, has occurred in other large cities of the United States.

7. These results make the clinical recognition and study of typhus fever of increased importance and necessitate the exercise of appropriate prophylactic measures.

With regard to the micro-organism of typhus fever the *Medical Record* has the following:

Another of the infectious diseases is yielding up its secrets to the persistence of the investigator. The infectious agent of typhus fever has been proved to exist in the blood of patients suffering from the disease, the virus has been transmitted through long series of monkeys, and the *Pediculus vestimentorum* has been demonstrated to be the chief if not the only agent whereby the infection is carried from one individual to another. The ultimate cause, however, has proved very elusive.

Predjetschensky (*Centralblatt für Bakterienkunde,* etc., 1 Abt., Bd. 55, Heft 3) describes an organism which he has succeeded in isolating from the blood of these patients. He was able to obtain pure cultures only by inoculating 200 c.c. of bouillon with from 2 to 5 c.c. of blood, drawn between the sixth and ninth day of the disease. It is described as a short, fairly thick bacillus with rounded ends, occurring singly or in chains. It is actively motile and is not stained with Gram. Bouillon is uniformly clouded with the formation of a grayish precipitate. Milk is coagulated in 3 or 4 days, gelatine is not liquified. On slant-agar it develops as an elevated growth with a glistening grayish-white film, the water of condensation being changed into a cloudy, gummy mass. On potato it forms a thick dull-gray film which later becomes brownish without the presence of gas bubbles. In dextrose bouillon it forms no gas but does produce acid. It does not form indol. On the Contradi-Drigalski medium there are produced raised blue colonies which after three days are surrounded by a rose colour; on Padlewsky medium with malachite green, golden yellow colonies from which begin to show a green tinge in three or four days.

The organism was agglutinated by the serum of typhus patients in a dilution of 1·10 in 1 hour, and of 1·40 in 4 hours, while controls with the serum of persons in health or suffering from other diseases showed no agglutination. Mice, dogs, and guinea pigs inoculated with a pure culture developed a fever and died, and the bacillus was recovered from their organs. The author was able also to cultivate this organism from the sputum of his patients and he thinks that its presence here may be the chief factor in the spread of the disease. This bacillus is, apparently, not unlike the one which Ricketts and Walker found in stained blood smears and which, in their opinion, belonged to the hæmorrhagic septicæmia group.

A typical case of typhus fever was diagnosed at your Grosse Isle Quarantine Station on the arrival there of the ss. *Sardinian* on June 14. The patient as well as all

exposed passengers and members of the crew were landed, and the vessel released after prompt disinfection.

The disease was stamped out at your Quarantine Station.

Beri-beri.—The *Journal* thus speaks of the etiology of this disease:

So many observations have been reported of late favouring the belief that beri-beri is caused by a dietary insufficiency, that this conclusion is now apparently well established. In a recent contribution to the subject, Fraser and Stanton not only have furnished additional evidence toward this view, but have carried the investigation of the dietary factor peculiarly lacking, to a point previously unattained.

The employment of 300 native labourers in the construction of a road through virgin Malayan jungle offered an unusually favourable opportunity for their work. By properly examining all candidates for employment it was possible to exclude with a presumption of certainty men already suffering from the disease; and regulation of all sanitary conditions precluded the possibility that these might influence the results. The labourers so circumstanced were divided into two equal parties, and housed some distance apart. One section was then fed on polished rice as the staple article of diet, the other on rice which had been parboiled before husking. The latter grain differed from the former in the preservation of a great part of the subpericarpal layers which are removed almost wholly by the more usual method of polishing. Of the two parties, the men fed on polished rice began to develop cases of beri-beri in three months, without the appearance of any cases in the other section. Conditions were then reversed, and after a somewhat longer period, the party previously exempt began to suffer from the disease, without any cases originating in the control party. The influence of place and the possibility of communicability were tested by the transfer of groups of sufferers, with negative results.

The polished rice thus responsible for the human disease was then tested by feeding to fowls. Eijkman and others had previously shown that by feeding chickens on such grain it was possible to produce in them an affection very closely resembling human beri-beri, both clinically and anatomically. Basing their experiments on this, Fraser and Stanton were able to cause a peripheral neuritis almost at will. It was found that the polished grain invariably caused the disease in a large proportion of the fowls if fed to them for a sufficient time. Substitution of parboiled rice, and the addition to the polished rice of the parts removed in polishing, served to protect the animals. Attempts to extract a soluble poison from the polished grain were unsuccessful, but on the other hand the extraction of unpolished rice with alcohol destroyed its protective power. The clue so obtained was followed up, and Fraser and Stanton succeeded in isolating to a certain point the element essential for protection. In addition to being extracted by alcohol, it was dissolved by 0·3 per cent. hydrochloric acid. An important constituent so removed is phytin—a complex organic compound with a high percentage of phosphorus pentoxid. As the amount of phosphoric acid in the grain had been found to give an index to its power to prevent neuritis, it was first thought that this might be the desired constituent; but feeding experiments contradict this view, while the extract after removal of the phytin was still effective.

Although it has not so far been absolutely proved that the peripheral neuritis of fowls is identical with beri-beri, there is no good reason for the contrary belief, so that quite probably the results of Fraser and Stanton will be found directly transferable to the human disease. While they unfortunately did not succeed in the ultimate isolation of the essential dietary factor, they have apparently carried the problem much further along, and more investigation should soon clear up its last uncertainties.

The neuritis is probably not due to lack of phosphorus compounds in the diet, as has been claimed. The neuritis-preventing substance is capable of dialysis and thus colloids are excluded from consideration.

Close on this announcement from the United States Army Board for Study of Tropical Diseases, has followed the report of Dr. Casimir Funk of the Lister Institute

in London. A careful chemical search for the effective agent shows that it is present in minute amounts only, probably not more than 0·1 gram per kilo of rice. 'The substance which is absent in polished rice and is contained in rice polishings is an organic base which is completely precipitated by phosphotungistic acid and by silver nitrate of baryta. The curative dose of the active substance is small; a quantity of substance which contains four milligrams of nitrogen cured pigeons.' If further investigation substantiates these claims it will afford another evidence of the profound importance of the hitherto underestimated 'accessory' components of our diet, even though they are present in what may be termed minimal amounts.

Human or other hair unmanufactured or uncleaned.—In consequence of the general movement in China for the abolition of the pigtail, it was thought that such hair might be imported into this country for trade purposes. You, therefore, in January last caused an amendment to the Quarantine Regulations to be proclaimed in the *Canada Gazette* to the effect that 'Human or other hair unmanufactured or uncleaned must be unpacked and disinfected by steam, or boiling water, before it is allowed entry into Canada.' And the following question was inserted in question No. 4 after the word 'Cargo': 'Is there any human or other hair unmanufactured or uncleaned in such cargo?'

Vessels from United States ports south of San Francisco.—For some time coasting vessels from San Francisco and ports north of it have, by ministerial order, under section 7 of the Quarantine Regulations, been excepted from routine quarantine inspection.

In February last, Dr. Watt, the superintendent of British Columbia quarantines, drew attention to the following facts: The vessels that clear from United States ports south of San Francisco are mostly coasting vessels, and have usually taken down cargo from British Columbia or have sailed to such southern port from San Francisco, or they are new vessels coming from England for the coasting trade in British Columbia, and simply calling for coal. The piers at which they touch are at some distance from the towns, and there is probably less contact with inhabitants on shore than is usually the case with vessels in port. The conditions as regards the health of the communities in southern California are just as readily ascertained as are those of the communities back of San Francisco, so the reasons apply as were accepted when the exception was made applicable to San Francisco and ports north thereof. Dr. Watt accordingly recommended that the exception might be made to include vessels from all ports on the Pacific coast of the United States. In this recommendation I concurred. And you were pleased to order that such ports be so excepted under section 7 of the Quarantine Regulations. These exceptions under section 7 are only temporary and during your pleasure, and can be set aside at any time by your order, should a community or a season become, or threaten to become, unhealthy.

International Hygiene Exhibition, Dresden.—To this exhibition models and plans from the Grosse Isle quarantine station in the St. Lawrence were sent. They were prepared by the Department of Public Works for the Minister of Agriculture. Dr. J. F. Hansberger, of Berlin, Ont., was sent in charge of our exhibit. In his report he says: 'I am glad to be able to report that I succeeded in having your exhibit placed in the pavilion of Great Britain, where it was assigned to a prominent position, opposite the main entrance, in the compartment devoted to contagious diseases. The daily attendance at the exhibition was from 15,000 to 25,000, so that thousands passed through the building every day. Regular hours for demonstrations were allotted to each department, but in addition I devoted considerable time each day in explanation to smaller parties, in both German and English, of our quarantine system and other matters pertaining to Canada, in which I found them exceedingly inter-

ested. I have reason to believe that this will result in some immigration of a good class of settlers, for since my return home I have received correspondence from persons desiring to come to Canada, a number of whom are already on the way, wishing to participate in the harvest excursions to the Northwest.

'The Canadian exhibit was much admired and commended by all. Compared with others of similar character in the exhibition, its outstanding features were its excellent location, complete equipment, thorough organization and rigid enforcement of all regulations.'

International Office of Public Health, Paris.—The monthly bulletins from this bureau were regularly received during the year. They give much valuable information as to the movements of infectious diseases and of the means employed by the different signatory countries to meet and control them.

Sleeping Sickness Bureau.—The bulletins of this bureau issued under the direction of the honorary managing committee in London have also been regularly received.

In both cases spare copies have been distributed to the provincial boards of health.

The Public Health Reports published weekly by the United States Public Health and Marine Hospital service contain most valuable information gathered from the United States consular agents and the medical officers of the service stationed abroad. This excellent service sustained a severe loss this year in the death of Surgeon-General Walter Wyman. He has been succeeded in the command of the service by Surgeon-General Rupert Blue.

Foreign and Domestic Reports.—These have been received from various points abroad both in Europe, Australia and the Orient, from the many states of the United States, and the many provinces of Canada, in weekly and monthly returns and bulletins, and are of the greatest use to this service.

Canadian Public Health Association.—The first and inaugural meeting of this new departure in public health work in this country was held at Montreal, December 13 to 15 last. The meeting was graced by the presence of Their Royal Highnesses Field Marshal the Duke of Connaught, the Duchess of Connaught, and the Princess Patricia. Addresses on public health were given by His Royal Highness, by the Right Hon. R. L. Borden, and the Hon. Mr. Burrell. And I gave my experience of the history and evolution of public health in Canada since pre-confederation days, at the request of the chairman, Dr. Starkey, Professor of Hygiene of McGill University.

National Biological Laboratory.—Another step in advance this year, the importance of which can hardly be overrated, is the inclusion for the first time of an item in the estimates of $25,000 towards the construction of Dominion biological laboratories. I have been urging this for at least a quarter of a century. In such laboratories the various vaccines, sera and antitoxins may be prepared and tested by men on salary and without any personal interest in their sale. They may be issued bearing the government stamp as a guarantee of purity and reliability, and marked with a date limit of efficiency. The general practitioner throughout the country will then know just what he is using, and both he and his patient will be much better protected than they are at present. Moreover in such national laboratories there may well be bacteriologists, chemists, &c., engaged in original research. This country may well rise above the position of hanging on to the skirts of other nations and waiting to hear from them. It is fully time that in such national laboratories Canada also should have her investigators taking their part in the advances of science.

Official visit from Australia.—In August last a telegram was received by His Excellency the Governor General from the Governor General of Australia to the effect that Dr. W. Perrin Norris, Director of Quarantine for the Commonwealth of Australia, was being sent on a visit abroad with a view to obtaining information regarding organization for the exclusion and isolation of quarantinable diseases and diseases under the Immigration Restriction Act at the principal ports in various parts of the world. By direction, I had Dr. Watt meet Dr. Norris on his arrival and show him over the William Head station. Upon his arrival here I explained our system, and took him down to and over the quarantine station of Grosse Isle in the River St. Lawrence; and at Quebec put him in touch with the immigration officials, by whom (Dr. Lavoie and Dr. Pagé) he was shown their methods most fully. Dr. Norris was gladly given every opportunity of studying both our separate methods in connection with the St. Lawrence ports of entry, handling of vessels, passengers, cargoes and crews. In Australia the medical services of quarantine and immigration are combined.

Circulars.—Circular letters were issued from time to time to your different officers, calling their special attention to various matters, during the year. On April 8, *re* Bubonic Plague in Eastern Java and in New Zealand; on June 16, *re* Plague in Glasgow; on July 18th, *re* Cholera at the New York Quarantine Station Hospital, from Italian ports; on July 27th, *re* bacteriological examination of all steerage passengers arriving at ports in Canada from ports or places infected with cholera; on November 28, *re* bacteriological examination of passengers from Italy suspected of being possible cholera carriers applying only to cholera infected vessels; on January 17, *re* disinfection of imported unclean human hair.

Official visits and inspections.—On the 3rd of April last I went to Kingston, Ont., by order of the then Minister to represent him officially at the launching of the new quarantine steamer *Polana* built by the Kingston Shipbuilders' Company, Limited, and destined for service at the station of Grosse Isle in the River St. Lawrence.

On May 16 I went to London, Ont., to attend the annual meeting of the Canadian Association for the Prevention of Tuberculosis.

June 7-9 the annual meeting of the Canadian Medical Association held in Montreal.

June 16 I left for the Atlantic coast and inspected the Leper Lazaretto at Tracadie, N.B., and the quarantine stations at Chatham and St. John, N.B., Halifax, Sydney and Louisbourg, N.S., Charlottetown, P.E.I., the quarantine buildings at Pictou, N.S., and the quarantine station at Grosse Isle, Que., in the River St. Lawrence.

August 4 I left for British Columbia. I inspected at Vancouver, Victoria, the Williams Head Quarantine Station and Darcy Island Leper Lazaretto, and in company with Dr. Watt, the superintendent of British Columbian quarantines, visited and inspected the quarantine station of Prince Rupert.

On my return trip leaving Vancouver on August 24 I stopped over at Kamloops to visit, on the invitation of Dr. Fagan, the Provincial Health Officer for British Columbia, the Tuberculosis Sanatorium at Tranquille. And I further stopped over at Edmonton, Regina, and Winnipeg to confer with the executive officers of the Provincial Boards of Health of Alberta, Saskatchewan and Manitoba on frontier and other public health matters in which the Dominion and those provinces are alike interested.

October 17-20 took the Australian Head of the Quarantine and Immigration Services to Grosse Isle and Quebec.

December 13-15 inaugural meeting of the Canadian Public Health Association at Montreal.

St. John Ambulance Association.—The organization of the Canadian Branch of this association of the Order of the Hospital of St. John of Jerusalem in England may well be included amongst the advances in public health work. Its teachings and results in first aid to the injured, nursing and hygiene are directed to lessen the sum of sickness and suffering and so aid in the betterment of the health of the people of Canada. The annual meeting was held in the Russell Theatre, Ottawa, on the evening of March 6, under the gracious patronage of Field Marshal His Royal Highness the Duke of Connaught, Grand Prior of the Order, who addressed the assembly, and presented the certificates to those who had successfully passed the examinations in the classes of the Ottawa Centre, 82 in number. The meeting was also graced by the presence of Her Royal Highness the Duchess of Connaught, and Her Royal Highness the Princess Patricia, both Ladies of Justice of the Order.

My official journeyings from coast to coast have given me the opportunity of doing a certain amount of missionary and organization work in connection with the Canadian Branch, of which I have the honour to be president.

Stations. Grosse Isle, Quebec.—Vessels inspected, 367; a decrease of 11 as compared with last year. The medical superintendent attributes this largely to labour strikes. He points out that passenger steamers were 60 per cent of total vessels inspected, which is an increase of 5 per cent over last year, and 56 per cent as compared with twelve years ago. The constantly increasing size and tonnage of the vessels being built may also have something to do with the diminished number, as in spite of it the total number of passengers and crews examined at the station was 193,313, an increase of 15,146 over last year. Eight steamers required thorough disinfection, besides the partial disinfection of many others. The vaccinations exceeded 6,000. Admissions to hospital, 838; largest number at one time, 313. The following infectious diseases were reported or discovered: Typhus fever, smallpox, diphtheria, scarlet fever, measles, retheln, varicella, mumps, erysipelas, and enteric fever. There were 7 deaths in hospital: from measles 1, enteric fever 2, diphtheria 2, gastro-enteritis 1, meningitis 1. Eight cases of smallpox were landed, from six vessels.

Owing to the threatening of cholera from Italy a bacteriological assistant was added to the staff as already noted. Bacteriological examinations were made of all immigrants from Italy, and two cholera carriers were discovered.

The quarantine steamer *Challenger*, condemned as no longer fit for the arduous inspection service for which she has been employed since 1886, has been replaced by the new steel steamer *Poland*.

Provision has been made by you for the following very necessary works and improvements at this station: Extension of the western wharf; residences for the bacteriologist, assistant medical officer, and nurses; laboratory and equipment; new hospital; new first-class detention building; and conversion of the present hospital into a detention building for relations awaiting the discharge from hospital of members of their families.

Rimouski, Que.—Advance substation of Grosse Isle. Vessels inspected, 32. Of these 6 were found to have infectious disease on board, and were directed to report at Grosse Isle for treatment.

Halifax, N.S.—Vessels inspected, 376, being 46 more than last year. Persons inspected, 118,639, being 17,045 more than last year. Admissions to hospital, 44; diseases, measles, tonsilitis and diphtheria. One death, from broncho-pneumonia, secondary to measles. A resident engineer has been appointed by you to look after the valuable lighting and disinfecting appliances at the quarantine station at Lawlor's Island. The service lost a most valuable officer in the unfortunate accidental drowning of the medical assistant, Dr. Doyle. Provision has been made by you for several much needed works and improvements at this station.

St. John, N.B.—Vessels inspected, 164; persons inspected, 39,223. an increase of 4,742 over last year. Thirty persons were admitted for detention; of these there were cases of measles, chicken-pox, rheumatism, and enteric fever. Provision has been made by you for needed improvements at this station also.

Sydney, N.S.—Vessels inspected 115, of these 95 were steamships and 20 sailing vessels. No quarantinable disease was found on any of them.

Louisburg, N.S.—Vessels inspected 27; no quarantinable disease.

Chatham, N.B.—Vessels inspected 21. No quarantinable disease.

Charlottetown, P.E.I.—Vessels from abroad inspected 9; in addition to this the daily steamer from Pictou was inspected from April 1 until August 23, and also any other vessels arriving from New Brunswick and Nova Scotia on account of the prevalence of smallpox in those provinces. Vaccination was performed upon all passengers not protected against the disease.

William Head, B.C.—Vessels inspected 161; persons inspected 33,896. There were 11,932 Chinese in steerage and 2,986 Japanese of whom 1,037 were women. There were 15 other Asiatics in steerage, and 15 stowaways. In crew list there were 4,528 Chinese and 3,515 Japanese. Two vessels from the Orient were quarantined for smallpox, and one coastwise passenger steamer was treated at quarantine at the request of the provincial authorities, there having been a case of smallpox on the vessel between Prince Rupert and Queen Charlotte Islands. The only other infectious disease met with was measles. Provision has been made by you for improvements and repairs to buildings, and also in the engineering department.

Victoria, B.C.—No vessels from abroad inspected.

Vancouver, B.C.—Vessels inspected 2. No quarantinable disease.

Prince Rupert, B.C.—No quarantinable disease brought to this port during the year. The quarantine hospital is now complete. You have made provision for the building of a wharf, and for other much needed requirements.

Tracadie Leper Lazaretto, N.B.—Three new cases were admitted during the year. One patient died. Present number of patients 22, 12 males and 10 females. As mentioned already trial is being made of nastin as a means of treatment.

Darcy Island Leper Lazaretto, B.C.—This lazaretto has not been occupied by any leper during the last twelve months.

Public Works Health Act.—Your inspector under this Act, Mr. Charles A. L. Fisher, reports for the territory from Winnipeg, Man., east to the Atlantic ocean, that the year has been an exceptional one in the almost non-appearance of infectious disease. He further reports that he has found the medical service given to be complete, and the sleeping quarters and boarding of the men to be fully equal to the very good conditions in that way reported previously.

Dr. A. E. Clendenan, your western inspector from Winnipeg to the Pacific ocean, reports that the standard of camp construction and of grade hospitals and the merits of the medical men are in advance of last year and the year before.

Medical Staff.—Additions and alterations: At Grosse Isle, owing to the ever increasing immigration and consequent work, and to the realization of the danger from cholera carriers, Dr. Coté has been appointed by you as second medical assistant, and Dr. Heagerty, bacteriologist and medical assistant.

At Halifax Dr. V. N. Mackay has been appointed by you as bacteriologist and medical assistant in place of Dr. Doyle, deceased.

At St. John Dr. Warwick has been appointed by you as bacteriologist and medical assistant.

At William Head Dr. W. P. Walker, who has been at that station since July 1, 1909, as bacteriologist and medical assistant, resigned to take up other work, and the position was filled by the appointment of Dr. J.D. Hunter.

I have the honour to be.
Sir,
Your obedient servant,

F. MONTIZAMBERT, M.D.,
Director-General of Public Health.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 2.

(G. E. Martineau, M.D.)

Grosse Isle, Que., March 31, 1912.

Sir,—I have the honour to submit this, my annual report, to March 31, 1912, as Medical Superintendent of the St. Lawrence quarantine service.

The quarantine year just elapsed has been a very unsanitary one, at least as far as quarantinable disease is concerned. From the very opening of the station, until late last autumn, we have unceasingly had to fight against infectious disease menacing to enter and spread into this country.

Six passenger vessels arrived in quarantine with smallpox on board, two with cholera, and one with typhus fever, so making a total number of more than 1,100 people exposed to contagion, and landed on the island for usual period of observation.

This means that 'quarantines' have succeeded 'quarantines' all the season round, so keeping the whole staff of the station very busily engaged.

On July 28, we received ministerial orders to the effect that a bacteriological examination of the stools of every Italian steerage passenger entering Canada be made, so as to exclude possible cholera carriers coming from Italy, where the malady was then prevailing. These were carried on for the remainder of the season, and so enabled us to detect one of these cholera carriers who was bound for this country.

We also paid special attention to incoming vessels from other infected places, as warned about by your Director-General of Public Health, from time to time during the season.

Outside of the usual quarantinable diseases with which we ordinarily have to deal, it might perhaps be noted, two very uncommon cases have made appearance on passenger vessels: cholera and typhus fever. The former case having not presented itself at the station for over thirty years, and the latter, although appearing to be more prevalent in other countries since a few years, is, however, regarded as an uncommon case in this country.

This year has also seen the extinction of the very interesting case of cholera detained in our hospital since November 17, 1910. As reported in my last annual report, the patient, a Russian, by name of Goulick Seide, was a cholera carrier. He so carried in his intestines the bacillus of the malady until a somewhat advanced date in this season, when he passed under Immigration Department's control, after bacteriological examination of his stools had proved he was perfectly free from all cholera germs. It may, however, be noticed here that he was not judged by the Immigration Department as a desirable immigrant, and was consequently deported to his country.

Inspection of vessels.—367 vessels have showed themselves for quarantine inspection this year, and been cleared at this port. This number shows a decrease of 11 as compared with last year, which decrease is largely due to labour strikes in Great Britain during the summer. Passenger steamers were 60 per cent of this total number, which is an increase of 5 per cent over last year, and 56 per cent as compared with twelve years ago.

The total number of passengers and crew examined at this station was 193,313, showing an increase of 15,146, if it is compared with last year.

They were divided as follows:—

Cabin	6,368
Steerage	97,386
Crew	47,062
Intermediate	41,766
Cattlemen	674
Stowaways	57

Infectious or contagious disease was reported or discovered at station on every passenger boat sailing to this port, on one or more occasions, with the exception, however, of the ss. *Lake Champlain* and *Pomeranian*.

Patient transfers from vessels to hospital numbered 102 this season.

On the following freight boats infectious disease was discovered: ss. *Bendu, Ionia, Georgetown,* and *Manchester Exchange.*

The following infectious diseases were reported or discovered: Typhus fever, smallpox, diphtheria, scarlet fever, measles, retheln, varicella, mumps, erysipelas, and enteric fever.

Deaths were reported on the following steamers: SS. *Ionian,* 1; *Willhead,* 2; *Mount Temple,* 1; *Ramore Head,* 1; *Mount Royal,* 1; *Ascania,* 1; *Megantic,* 1; *Tunisian,* 2; *Corsican,* 2; *Sicilian,* 1; *Montezuma,* 1; *Welshman,* 1; *Barcelona,* 2; *Montreal,* 1; *Pomeranian,* 1; *Montrose,* 1; and were due to: Syncope, 2; injuries during voyage, 3; lost overboard, 4; diphtheria, 2; cerebral hemorrhage, 1; congenital heart disease, 1; pneumonia, 3; pulmonary hemorrhage, 1; bronchitis, 1; infantile diarrhœa, 1; premature birth, 1.

Births were reported 19 times: 10 males and 9 females.

Typhus fever.—SS. *Sardinian,* Captain Hamilton, sailing from London on June 1, with 59 intermediate, 120 steerage and 87 crew, arrived in quarantine on June 14, with one case of typhus fever on board. The patient as well as all exposed steerage passengers, and also crew, having been landed, the vessel was released after having had her hospital and compartments occupied by exposed passengers thoroughly disinfected. No other cases having broken out amongst passengers and crew detained under observation, they were released on June 26. The patient fully recovered, and was discharged from the hospital on August 15.

Smallpox.—The following statement of smallpox infested vessels arriving in St. Lawrence this year is a summary of those cases handled at quarantine this season:—

Vessels.	Master.	From.	Sailed.	Arrived.	Passengers.		Steerage.	Crew.	Cases.
					Cabin	Intermediate.			
Dominion	Mendus	Liverpool	April 20	May 1		313	724	181	2
Albania	Jeffries	Southampton	May 2	May 15		27	557	132	1
Gothland	Prager	Rotterdam	May 8	May 19			1,778	128	1
Corsican	Cook	Liverpool	June 23	June 15	23	406	816	280	1
Wittekind	Willemsen	Rotterdam	Aug. 12	July 31			543	84	2
Barcelona	Nippersch	Rotterdam	Aug. 26	Aug. 14			284	61	1

All the above-named vessels have been given as quick a despatch as was possible, no one having been detained in quarantine for more than 36 hours. They were thoroughly disinfected, and everybody on board vaccinated, before allowed to proceed.

Vaccination also took place for all contacts detained on the island, and in many instances more than once for those upon whom it was not first successful. Several new cases broke out amongst them after their landing, and they consequently were transferred to hospital for treatment. No cases proved, however, to be fatal, and every smallpox patient recovered and was released when perfectly well.

On one occasion only was it necessary to land for refusal of vaccination on board the boat: a family of five ex ss. *Albania.*

Cholera suspects.—On two occasions this year we had to make bacteriological examinations of stools of cholera suspects passing through this quarantine. One was for a member of the ss. *Bendu's* crew, freight boat from Bombay; and the other one for a member of crew also on ss. *Albania* arriving at this station on October 29. In both cases bacteriological examinations were negative, although symptoms presented by patients were more those of cholera than of any other fever. One of those affected, however, died in hospital seven days after he had been taken ill.

The history of some of these patients might, perhaps, be of some interest here.

The ss. *Bendu,* Captain Neillson, sailed from Baltimore on July 8, with 35 crew and a water ballast. Before calling at that port she had been at Bombay, a place reputed to be generally infected, and arrived here on the 15th with three of her crew apparently suffering with cholera. One of the sick, Alexander Hargu, a Finlander, had first been feeling ill on July 13, viz., five days after having left Baltimore. First symptoms were great thirst and cramps in the stomach. Next day he had profuse diarrhœa, which lasted until he reached this port. When taken ashore here, he vomited and had stools nearly every half hour. For some time there was blood in his stools; his tongue was very dry and coated, and pulse was very weak, with temperature under normal. These were the symptoms until he died on July 20.

The history is about the same for other two patients ex ss. *Bendu,* with the exception, however, that one case at the end turned into a case of enteric fever, and that both recovered well and were subsequently discharged from quarantine on July 22 and August 15, respectively. It was found that they were suffering only from gastro-enteritis, due to drinking bad water carried on board. A bacteriological examination of that water proved it to contain lots of germs. Canned food employed by them was also examined, but was found to be sound and in good condition. The vessel was thoroughly disinfected, and had her water tanks emptied after the water contained in the same had been also disinfected. She was released on July 17 with another crew in charge of her. All the crew kept under observation was discharged on the 22nd, after it had been proved that we had not to deal with a case of cholera.

The other very doubtful case of cholera was one from the ss. *Albania,* October 17.

SS. *Albania,* Captain McNeill, sailed from Southampton on October 17, with 169 steerage, 123 crew, and arrived at station on October 29. One of her sailors, who had been on a vessel calling at Naples and other Mediterranean ports previous to his joining this vessel for this voyage, was presenting symptoms of cholera of a very typical character. He was taken ashore at this quarantine, and boat detained awaiting results of bacteriological examination, but same having been negative, the steamer was in consequence released immediately.

Cholera carriers.—Two cholera carriers have been located this year in the course of quarantine season. One was a sailor on board the ss. *Grampian,* and the other a passenger Italian from the ss. *Lake Erie.*

The ss. *Grampian* arrived at Grosse Isle on August 27. The man who was found to be a cholera carrier on board that steamer was English, and had been at Novorrossisk, which is a port in the Black Sea, seven or eight weeks before joining the *Grampian* at Glasgow. He never complained of any illness, with the exception, perhaps,

of a slight attack of diarrhœa some two days after having left Glasgow, viz., on August 21, on his way here. The diarrhœa that he suffered then looked more like enteritis than cholera, and when he reached here he felt perfectly well. He had no more diarrhœa, and nothing could lead us to suspect him as a cholera carrier. Nevertheless, bacteriological examination of his stools just proved the contrary. Under proper treatment, he gradually got rid of his germs, and was in condition to proceed on September 16.

The latter was that of an Italian coming from Valvasone, province of Udine, in the north of Italy. This immigrant arrived in quarantine on board the ss. *Lake Erie* August 7, with 32 other steerage passengers of the same nationality. Entering in the class of passengers upon whom bacteriological examination had been enforced, all 33 were landed for that purpose. And although the examination had given negative results on 32 specimens, it, however, proved that one of these thirty-three, named Vacchero Guiseppe, carried cholera bacilli in his intestines. He was then transferred to hospital for treatment until all germs had disappeared, and was discharged from quarantine on August 26.

With these two cases we have, thus far, dealt upon three cholera carriers at this station since last year, the first one being Goulick Seide, who has been carrying the vibrio of the disease for over six months. I think this is the longest case of cholera carrier known until now. We cannot but believe that during the course of the last past years, cholera carriers must have repeatedly landed on this continent, but whether through the weakening of microbes, or through the better conditions of hygiene now prevailing in civilized countries, no ill results have issued.

Some day it may happen that an individual bearing highly virulent vibrios may effect a landing, and then, if by chance he passes to some place where his foecal matters can contaminate a water supply, we may find the development of an apparently spontaneous epidemic of cholera. Indeed we are strongly inclined to attribute to this, rather than to those actually suffering from the disease, the gradual spread of cholera along trade routes. No quarantine regulations, it seems to us, can be devised against such a possibility. Fortunately, the chances of such an event appear to be singularly slight.

Quarantine work.—The work at this station has been very hard this year, it being the heaviest we have had for a long time. We have made a thorough disinfection of steamers on eight occasions. The total amount of people vaccinated was over 6,000. The total number of admissions to hospital amounted to 838; and we constantly had to treat a number varying from 25 to 313 passengers at same time, suffering from different diseases. 197 bacteriological examinations have taken place during the season, and 1,138 passengers have been landed for a quarantine of observation. We had two births and 7 deaths in hospital, which deaths were due to the following diseases: Measles, 1; enteric fever, 12; diphtheria, 2; gastro-enteritis, 1; meningitis, 1.

Staff.—Dr. Bélisle continued this year to be in charge of the Rimouski station.

The appointment of a bacteriologist for this station has proved to be of inestimable value in the diagnosing of contagious disease. We have found in the person of Dr. Heagerty a very competent man to fill this position. He is attentive to duty and of good character. I may, perhaps, be permitted to express here my entire satisfaction with all services rendered by him, as well as by all other employees of this quarantine service.

The appointment of an interpreter as office steward on board the *Polana,* has also been of great help in the inspection of vessels. This has done away with the distressing scenes that used to occur when we landed foreign patients, and had no one to

explain to them why this was done. Besides that, he is of great advantage in helping to get true histories from sick people, this is what we were unable to do before. He is also very useful when we land passengers and keep them under observation at the upper end, as well as when they have to be transferred at hospital.

Improvements.—The exchange of the old ss. *Challenger* for the new steamer *Polana* may be regarded as the principal one at the station this year. She is a strong and good boat, and after a few improvements will be very nearly perfect.

Requirements.—The station having been kept open all the year round last year, and having been closed only on the 22nd of December this year, and as this is going to be the case every year in future, it would be necessary to make certain improvements towards rendering it comfortable for the winter. For instance, furnaces should be installed in certain houses, water pipes put under ground, and one of our boats should also be fitted and equipped for winter navigation. Besides that there is the building of a laboratory which is immediately needed, the erection of a new hospital to accommodate all passengers admitted, the present one having become too small, and the renewing of all old detention wooden sheds which date from 1832 and 1848. Also the construction of another first class passenger detention building. Some other minor repairs or works are still necessary, the list of which has been respectfully submittd to the Department.

Official visits.—We had this year the honour of the following official visits:

His honour the Lieutenant-Governor of this province, the honourable the Minister, and Deputy Minister of Agriculture, the Vice-Royal Consul of Italy, Dr. Viola; the Director-General of Public Health of Australia, Dr. Norris; the American Medical Officer at the Port of Quebec, Dr. Baily; and the Director-General of Public Health of Canada, Dr. Montizambert.

The whole respectfully submitted.

I have the honour to be, sir,

Your obedient servant,

G. E. MARTINEAU, M.D.,

Medical Superintendent of the St. Lawrence Quarantine Service.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 2a.

(Ernest Belisle, M.D.)

Rimouski Quarantine Substation, April 1, 1912.

The Honourable the Minister of Agriculture,
Ottawa.

Sir.—I have the honour to submit to you my report for the year ending March 31, 1912.

Thirty-two vessels were inspected at this station during the season.

Infectious diseases were reported on the following vessels calling here to land English mails: On May 6, ss. *Virginian* had to stop at Grosse Isle for one case of measles; on May 12, ss. *Empress of Britain,* 1 case of varicella; June 9, ss. *Empress of Britain*, 1 case of chicken-pox; June 16, ss. *Victorian*, 2 cases of chicken-pox; on June 22, ss. *Empress of Ireland,* one sick person on observation; on November 17, ss. *Virginian*, 1 case of chicken-pox.

Of 32 vessels examined here 6 had to stop at Grosse Isle to land infectious cases.

I have the honour to be, sir,
Your obedient servant,

Dr. ERNEST BELISLE,
Quarantine Officer.

APPENDIX No. 3.

(N. E. MacKay, M.D., M.R.S.C.)

Halifax, N.S., April 1, 1912.

The Honourable the Minister of Agriculture,
Ottawa.

Sir,—I have the honour to submit this my annual report of this station for the year ended March 31, 1912.

The work of this station was uneventful during the year just ended. No vessel arrived in port with any of the major quarantinable diseases on board.

Number of vessels inspected 376, being 46 in excess of the preceding year; number of persons inspected, 118,639, classified as follows:—4,405 cabin; 19,649 intermediate, 55,746 steerage; 38,702 crew; 84 Chinese; 9 cattlemen; 6 stowaways—being 17,045 more than in 1910-11.

Minor quarantinable diseases were found on the following vessels:—ss. *Southwark,* from Liverpool, April 20, 1911, 2 cases of measles; ss. *Scotian,* from Glasgow, April 3, 1 measles; ss. *Mongolian,* from Glasgow, April 7, 2 measles; ss. *Hesperian,* Glasgow, April 10, 1 measles; ss. *Canada,* from Liverpool, April 10, 1 measles; ss. *Royal Edward,* from Bristol, April 11, 2 measles; ss. *Uranium,* from Rotterdam.

August 7, 1 measles; ss. *Volturno,* from Rotterdam, August 20, 2 measles; ss. *Empress of Ireland,* from Liverpool, December 8, 1 measles, bound for St. John; ss. *Uranium,* from Rotterdam, May 8, 2 cases enteric fever; ss. *Volturno,* from Rotterdam, May 28, 1 case enteric fever; ss. *Canada,* from Liverpool, January 28, 1912, 1 case measles for Portland, and one case of diphtheria for Halifax; ss. *Corsican,* from Liverpool, February 10, 1 case diphtheria; ss. *Empress of Ireland,* from Liverpool, February 9, 1 case of measles for St. John; ss. *Lituania,* from Libau, March 3, 3 cases of measles; ss. *Noordam,* from Rotterdam, March 31, 2 cases of measles.

Diseases other than quarantinable occurred or were found on the following vessels:—ss. *Scotian,* April 3, 1911, 1 case of pneumonia; ss. *Grampian,* November 24, 1 case of pneumonia; ss. *Volturno,* November 17, 1 case of pneumonia; ss. *Dominion,* December 30, 1 case of pneumonia; ss. *Oruro,* December 17, 1 case bronchitis, 1 of tumour; ss. *Teutonic,* December 7, 1 case of epilepsy, 1 of delirium tremens; ss. *Numidian,* December 14, 1 case of diarrhœa (child); ss. *Hesperian,* December 16, 2 cases of impetigo; ss. *Corinthian,* January 14, 1912, 3 cases lagrippe; ss. *Pretorian,* Sept. 6, 1911, 1 case of gastro-enteritis.

Death occurred on board the following vessels:—ss. *Southwark,* April 6, 1911, 1 death by suicide; schr. *Ida M. Clark,* June 7, from Falkland Islands, 1 death from beri beri; ss. *Pretorian,* from Glasgow, Sept. 6, 2 deaths from drowning (washed overboard); ss. *Palanza,* November 25, from Philadelphia, 1 man killed in engine room.

There was one birth on the ss. *Uranium* from Rotterdam, August 7, 1911, and 2 on the ss. *Corinthian,* from Liverpool, May 8.

There were 44 persons admitted to the station hospital during the year, between patients and their families, and 15 cases of sickness were treated in that institution, classified as follows:—13 cases of measles, 1 case of tonsilitis, and one of diphtheria. One death occurred from broncho-pneumonia, secondary to measles.

An electric plant is being installed in the ss. *Minoca.* The work which promises to be first-class is nearing completion.

A resident engineer was appointed about the middle of March to look after the disinfecting plant at the station.

In the sad death by drowning of my late assistant, Dr. J. J. Doyle, the quarantine service of this port lost a painstaking, obliging and capable officer.

Dr. Victor N. MacKay was appointed assistant port physician and bacteriologist in January last, and took up the work on the first of February.

A resident carpenter is needed at the station to keep the buildings in a proper state of repair.

I have the honour to be, sir,

Your obedient servant,

N. E. MacKAY, M.D., M.R.S.C., Eng.

Quarantine Officer.

APPENDIX No. 4.

(R. C. Ruddick, M.D.)

St. John, N.B., April 1, 1912.

The Honourable the Minister of Agriculture,
Ottawa.

Sir,—I have the honour to submit this my annual report of the St. John Quarantine Station for the year ending March 31, 1912.

During the year just ended we have inspected at this station 164 vessels; number of persons inspected 39,223; classified as follows:—Cabin, 625; second-class, 3,743; steerage, 24,918; cattlemen, 92; crew, 9,845; an increase of 4,742 over last year.

Thirty persons were detained at our hospital for observation. We treated at the hospital this year 10 cases of measles, 4 cases chicken-pox, 2 cases of scarlet fever, 2 of rheumatism and 2 of typhoid fever. All made good recovery. At the present time we have two cases of measles.

Deaths during the voyage were reported on the following vessels:—ss. *Montezuma,* 3 from typhoid fever and 1 from broncho-pneumonia; ss. *Pomeranian,* 1 from pluro-pneumonia; ss. *Saturnia,* 1 cardiac failure; ss. *Montfort,* 1 cardiac asthma; ss. *Montreal,* 1 from epilepsy.

Our water service is still unsatisfactory, big leaks in the pipe causing a waste of water, and the city engineer contends it lowers the pressure of water in West St. John too much to have it turned on constantly, therefore we get water three times in a week, an hour and one half each time, making four and one half hours for each week. In case of fire on our station our buildings would be wiped out before we could get in communication with the city officials to have the water turned on. A new pipe should be laid without delay.

Our telephone cable has given out, and through the kindness of the Marine Department we connected with their cable so we have a sort of a service still. I trust that a new cable will be laid at an early date.

We also need very much a low water wharf. As it is now, we have to lighter very often, and as the steamship companies are asking us for a night service, it is almost impossible to do so, and at times utterly so.

We want a low water wharf, and a government owned steamer, with a permanent crew to live on board, then we can board at any time we are called on. This is one of our most pressing needs. Our port is developing rapidly, and the call for a night service is getting imperative.

New buildings for our staff are very much needed; they are housed in detention buildings at present.

The appointment of Dr. Wm. Warwick as bacteriologist and assistant to me fills a pressing need, and I am pleased to say that Dr. Warwick takes hold of the work in a manner which leaves nothing to be desired.

I have the honour to be, sir,
Your obedient servant,

R. C. RUDDICK, M.D.,
Quarantine officer.

APPENDIX No. 5.

(H.RINDRESS, M.D.)

NORTH SYDNEY, March 31, 1912

SIR,—I have the honour to submit my report for the year ending March 31, 1912. During this period there were 115 vessels inspected at this port. Of these 95 were steamships and 20 sailing vessels. The year passed has been an uneventful one—no quarantinable diseases having been found on any of the vessels inspected.

I have the honour to be, sir,
Your obedient servant,
HORACE RINDRESS, M.D.,
Quarantine Officer.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 6.

(FREEMAN O'NEIL, M.D.)

LOUISBURG, N.S., March 31, 1912.

SIR,—I have the honour to submit my annual report for this quarantine station for the year ending March 31, 1912.

There were 27 vessels with a total number of 755 men. No quarantinable disease of any kind was brought to this port during the year.

I have the honour to be, sir,
Your obedient servant,
FREEMAN O'NEIL, M.D.
Quarantine officer.

To the Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 7.

(J. BAXTER, M.D.)

CHATHAM, N.B., March 31 1912.

SIR,—I have the honour to submit herewith the annual report from this station, ending to-day. Owing to the depression in the lumber trade and also the vessels having been largely chartered in exempted ports the number of exemptions made was small, being for the year only 21, consisting of 13 steamships, 2 ships, 4 barques, 1 barquentine, 1 three-masted schooner. Men examined 417; no contagious disease.

I have the honour to be, sir,
Your most obedient servant,
J. BAXTER, M.D.,

To the Honourable the Minister of Agriculture,
Ottawa.

Quarantine Officer.

APPENDIX No. 8

(Peter Conroy, M.D.)

Charlottetown, P.E.I., March 31, 1912.

Sir,—I have the honour to herewith submit my report for the year ending March 31, 1912.

There has been no case of contagious disease at this station during the past year.

On account of the continued prevalence of smallpox in different sections of New Brunswick and Nova Scotia, it was considered advisable to carry on the daily inspection of steamers from ports in those provinces as in the previous year. This inspection was continued until August 23, 1911. Vaccination was performed upon all passengers not protected against the disease.

No case of smallpox developed within this province during the past year.

There were nine inspections of vessels from ports in the West Indies and from beyond the sea.

The hospital is in good state of repair and the accommodation is quite satisfactory.

I have the honour to be, sir,
Your obedient servant,

P. CONROY, M.D.,
Inspecting Physician.

To the Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 9.

(A. T. Watt, M.D.)

Victoria, B.C., March 31, 1912.

Sir,—I have the honour to submit this my report of transactions at William Head Quarantine Station for the twelve months ending March 31, 1912.

During the twelve months there were 161 vessels inspected. There was a total number of 4,637 cabin passengers and 15,752 steerage passengers. The members of the crews numbered 15,507. There were 11,932 Chinese in steerage and 2,986 Japanese, of whom 1,037 were women. There were 15 other Asiatics in steerage and 15 stowaways. In crew list there were 4,528 Chinese, and 3,515 Japanese. In this list of steerage passengers are included many going to ports in the United States and many who are returning to this country after being away on a visit to their home land. The actual new arrivals now number less than in formers years. The steerage passengers and Asiatic crews of all vessels sailing from Oriental ports were bathed and had their personal effects disinfected. Passengers and all new members of crew are vaccinated either before leaving or within the day or two following. These precautions undoubtedly lessen the possibility of an outbreak of disease during voyage. Another factor tending to lessen such outbreaks is the reduction as above mentioned in the amount of Asiatic immigration the result of restrictions enforced by the various Immigration Acts, since with fewer immigrants the chances of an outbreak of disease are proportionately less.

There were two vessels quarantined, theR.M.S. *Empress of India* and the Br. ss. *Protesilaus,* both on account of smallpox. The *Empress of India* arrived July 22, 1911, having reported the case by wireless two days previously. The case was one of the sailors and followed exposure to a previous case landed in Japan. The steerage passengers, some of the cabin passengers and part of the crew were detained at the station but no subsequent case developed. The ss. *Protesilaus* arriving February 16, 1912, had a case of smallpox taken from the steerage. This was a Chinese passenger who became ill one day after leaving Yokohama. From this steamer a wireless report was also received so that by having steam ready, extra help engaged and guards on hand considerable time was saved to the steamer. With this case the infection had seemingly been acquired by the man in passing through Hong Kong where the disease was epidemic. He was vaccinated on the day after sailing and the vaccination acting in less time than the period of incubation of smallpox modified the disease in a marked manner and prevented the vesicles going on to pustulation. On this steamer there had been previously four cases of smallpox amongst pilgrims being carried from Jeddah to Singapore. At that time the crew had been vaccinated so that on next outbreak the majority could be considered protected and so be exempted from detention. No other cases developed amongst the steerage passengers held in quarantine.

The ss. *Princess Beatrice* of the coasting fleet of the Canadian Pacific Steamship Company was sent down from Prince Rupert by the provincial authorities, there having been a case of smallpox carried on vessel between Prince Rupert and Queen Charlotte Islands. The steamer was disinfected on December 17, and the crew vaccinated.

The only other quarantinable disease met with was measles. The cases were convalescent before arrival and further spread checked by effective isolation. A remarkable instance of what might happen with this disease if not controlled on a long voyage was exemplified in the case of the ss. *Oteric* which reached here May 1, 1911, after undergoing quarantine in Honolulu. This steamer had taken 1,550 Spanish and Portuguese steerage passengers through the Strait of Magellan to Honolulu and measles breaking out on the way there were over 500 cases, and there were 57 deaths therefrom.

While cases of bubonic plague have been reported in several of the ports from which vessels come to British Columbia, there have been no outbreaks reaching the extent such have reached in former years, and no cases have occurred on steamers leaving such ports. A plague infected rat was discovered in Seattle in September last and at occasional intervals infected ground squirrels are found in California. There have been three cases of plague in that state during the last twelve months, the infection being traceable to the ground squirrel.

No improvements could be undertaken at William Head station during past twelve months for the reason that appropriations were not available until too late in the season. Repair work could not be carried out for the same reason so with the exception of some general repairs which the staff were able to take in hand there is nothing to report with regard to such works.

There has been a modification of the order under section 7 of the Quarantine Regulations in regard to exemption of coasting vessels from inspection. Whereas formerly vessels from San Francisco and ports north thereof were exempted, this exemption has, since February 26, 1912, been extended to vessels from all ports of the United States on the Pacific coast.

On December 1, 1911, Dr. W. P. Walker, who had been at William Head since July 1, 1909, as Assistant Medical Officer and bacteriologist, resigned to take up other work, and the position was filled by the appointment of Dr. J. D. Hunter.

Last August, accompanying Dr. Montizambert, Director-General of Public Health, I went to Prince Rupert for conference with Dr. Tremayne, quarantine officer at that port, in regard the quarantine station now being established there.

Dr. W. Perrin Norris, Director of Quarantine and Public Health for the Commonwealth of Australia, who had been commissioned by the Federal Government to obtain information regarding organization for the exclusion and isolation of quarantinable disease, and diseases under the Immigration Acts at the principal ports in various parts of the world, spent two days last September in looking over the plant and general arrangements at William Head station and expressed particular approval of what he saw here.

The lazaretto at Darcy Island has not been occupied by any leper during the past twelve months.

I have the honour to be, sir,
Your obedient servant,
A. T. WATT, M.D.,
Superintendent British Columbia Quarantines.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 10.

(R. L. FRASER, M.D.)

VICTORIA, B.C., March 31, 1912.

SIR,—I beg to submit my report for the year just ended. No inspections were made at Victoria, as coasting vessels touching here were exempt by order.

Except being in consultation with Dr. Watt on quarantine matters I have performed no other duties this year.

I have the honour to be, sir,
Your obedient servant,
R. L. FRASER, M.D.,
Quarantine Officer.

To the Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 11.

(L. N. MACKECHNIE, M.D.)

VANCOUVER, B.C., March 31, 1912.

SIR,—Vessels inspected during the past quarantine year, 2. No quarantinable disease.

L. N. MACKECHNIE, M.D.,
Quarantine Officer.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 12.

(H. Ernest Tremayne, M.D.)

Prince Rupert, B.C., April 3, 1912.

Sir,—I have the honour to submit my report for the year ended March 31, 1912. No quarantinable disease of any kind has been brought to this port during the above period.

I am glad to report that the quarantine hospital is completed. The furnishings will be installed shortly and it will then be ready for service.

I have the honour to be, sir,
Your obedient servant,

H. ERNEST TREMAYNE, M.D.,
Quarantine Officer.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 13.

(J. A. Langis, M.D.)

Tracadie, N.B., April 1, 1912.

Sir,—I have the honour to submit my annual report as medical superintendent to the Lazaretto, at Tracadie, N.B.

There are at present at the Lazaretto, 22 inmates, 12 males and 10 females; the youngest 8, and the oldest 80 years of age; 18 are French, two of English, one of Icelandic and one of Russian origin. One died during the year and three were admitted. One of those admitted is from Tracadie, the two others are from Lameque, New Brunswick.

One patient left in February, on a visit only, and without permission. He is a case of anæsthetic leprosy, and much improved by the hypodermic treatment with Nastin and Chaulmoogra oil. I have visited him since and he promises to return soon. He has no ulcerated sores, and is not a danger to the community, being well isolated with his family.

In the present report I shall say only a few words of the treatment with Prof. Deycke's Nastin, which we began in May last, having to report at length when we have finished with it. Of the 15 patients under this hypodermic treatment, with few exceptions all have maintained good general health. We had, in one case, a general reaction, and in a few severe cases, as far as we can see, arrest of the leprous symptoms. This in the nodular form of leprosy. Old anæsthetic cases do not seem to be much affected by it.

In December, 1911, some friends of the patients very kindly sent them a beautiful graphonola, with a number of records, other friends added their contribution which they used in purchasing a larger stock of discs. The sisters have taken charge of the instrument and entertained the patients several times a week during the long winter months. Through your favour they were also furnished with a beautiful

organ. Owing to lack of train service it has only recently arrived, but the patients are now using it. This relieves the monotony of their lives, and helps them to forget their sufferings. There is no doubt that such recreation and mental diversion reacts on the physical condition of the inmates, and this accounts for them keeping so unusually well during the winter.

For long years those in charge of the institution have realized that the patients should be furnished with more amusements, and the generous response of kind friends, in supplying the musical instruments, has met a long-felt need, and added very much to the good cheer of the inmates, and will be a source of pleasure and enjoyment to them for years to come.

I have the honour to be, sir,
Your obedient servant,
J. A. LANGIS, M.D.,
Medical Superintendent.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 14.

(Chas. A. L. Fisher, J.P.)

Montreal, March 31, 1912.

Sir,—I have the honour to submit this my report for the twelve months ended March 31, 1912, as Public Works (Health) Inspector, for the territory from Winnipeg east to the Atlantic ocean.

During that period I have personally visited and inspected all such works covered by the Public Works (Health) Act, 1899, as have in any way been brought to my notice.

The term has again been an exceptional one, in the almost non-appearance of contagious and infectious diseases among the men employed on the various public works of the Dominion, coming under my inspection, there being only two outbreaks of smallpox, but although decreased about one-half from the number reported last year, there have been a good many cases of typhoid fever in the camp hospitals, mostly on the new construction work of the Algoma Central and Hudson Bay railway.

I am pleased to be able to report again, that on my several tours of inspection of the public works of the Dominion in my district for the past year, I found the medical service given to be complete, and the sleeping quarters and boarding of the men to be fully equal to the very good conditions in that way reported previously.

The number of public works coming under the regulations of the Act, in the territory east of Winnipeg, have been comprised exclusively of railway construction.

The following is a detailed report of the works I have personally visited and inspected during the past twelve months, as coming more or less, under the regulations of the Public Works (Health) Act, 1899.

NATIONAL TRANSCONTINENTAL RAILWAY.

This road is being built by the Dominion government, and at present all the sections between Winnipeg and Moncton, N.B., are now under construction, or have been completed.

I am pleased to report that on my visits to the works on said sections I found excellent hospital accommodation provided, and a duly qualified physician as district medical supervisor over each section of camps, which could be conveniently covered by him within the requirements of the regulations.

With the exception of some cases of typhoid fever, and one case of smallpox, there had been no outbreak of contagious disease, and the health of the men had been excellent.

I give below the extent and location of the camps, with other particulars of the works carried on by the various sub-contractors.

Superior Junction Section.—From Superior Junction east for 150 miles, to junction of the western section let to Messrs. E. F. and G. E. Fauquier. This is under contract to Messrs. O'Brien, Fowler and McDougall Bros., who have their headquarters at Fort William, Ont.

J. E. Joseph, of Pembroke, Ont., is the chief medical officer for the contractors, and J. M. McGrady, M.D., of Port Arthur, is the medical officer in charge of the work.

Two hospitals are yet maintained on parts of the contract. Access to the work is from Westfort, Ont., over the branch of the Grand Trunk Pacific railway from there to Superior Junction, or from Winnipeg over the section completed by the J. D. McArthur Co., and now being operated by the Grand Trunk Pacific Railway Company.

Superior Junction Camps.—Two gravel pits, Anderson & Mason, the Pembroke Contracting Co., Messrs. Bonfield & Harvey, A. J. Isbester, Messrs. Cameron & Chapelle. The Sturgeon Tie Co. and A. McDougall Bros., being the sub-contractors, and a steel gang operated by the O'Brien, Fowler and McDougall Bros. Company.

About 1,250 men were employed, who were located in ten camps, and housed and boarded in log and board dwellings by the sub-contractors, and the steel gang in boarding cars. The camps of some of the above named contractors are now closed, their work having been completed.

There were thirteen cases of typhoid fever, but the general health of the men and the sanitary conditions were good. There have been a few minor accidents, one death from syncope, one from phthisis, one crushed by derrick, and five from an explosion. Two good hospitals are still maintained on the work, one located about twelve miles from Superior Junction, and the other located towards the east end of the contract. W. Graham, M.D., and G. E. Denison, M.D., have been the medical officers in charge.

Nipigon Section.—From the east end of O'Brien, Fowler & McDougall Bros.' contract, east 75 miles. This is under contract to Messrs. E. F. & G. E. Fauquier, of Ottawa, who have sub-let it to the Nipigon Construction Company, Limited, who have their headquarters at Nipigon, Ont., and from which access is had to the work.

Nipigon Camps.—Messrs. McCaffery & McQuigge, Sherwood & Russell, Chambers & McColeman, D. W. Murray & Sons, and W. T. Parsons, were the sub-contractors from the Nipigon Company. There were six camps, access to which was by boat from Nipigon, thence over a tramway of fifteen miles, and then by boat over Lake Nipigon.

About 200 men were employed, who were housed and boarded in log buildings by the sub-contractors.

There had only been two cases of typhoid fever, the general health of the men, and the sanitary condition of the camps being good. There were two serious accidents, and three deaths, two from accident, and one from pneumonia. There were two hospitals maintained during the early part of the season, and then one up to the closing down of the work. Herbert H. Eedy, M.D., was the district medical officer of the

work, with residence at the hospital. All the above camps are now closed, some of the sub-contracts having been completed, and the others closed down for the winter.

Missanabie Section.—This is under contract to Messrs. M. P. & J. T. Davis of Quebec, who have sub-let it to Messrs. O'Brien, McDougall & O'Gorman, the contract covering the route from the east end of the Nipigon work, for 150 miles further east, to the junction of the Abitibi work, under contract to Messrs. E. F. & G. E. Fauquier.

Missanabie Camps.—There were fourteen sub-contractors on this work, and about 2,000 men employed, who were located in nineteen camps, and housed and boarded in wooden buildings by the sub-contractors.

There were no contagious diseases, but there were four deaths, one by jumping from train, one smothered by falling earth, and two from general debility. The general health of the men was excellent, and the sanitary condition of the camps was good. There were four hospitals on the work. A. Henderson, M.D., of Cochrane, Ont., is the chief medical officer, and he had four assistants, one in charge of each hospital, as follows: Dr. Kinsey, Dr. Levy, Dr. McKenzie and Dr. Richardson.

Abitibi Section West.—From about eight miles west of the Abitibi river, crossing westerly for 100 miles. This is under contract to Messrs. E. F. & G. E. Fauquier, of Ottawa. Access thereto is had from Cochrane, Ont. A. Henderson, M.D., is the chief medical officer of the work, with residence at Cochrane.

Abitibi West Camps.—E. F. Fauquier is the sub-contractor.

About 350 men are employed, who are located in five camps, extending over 50 miles of the work; and they are housed and boarded in log buildings by the sub-contractors.

There was one case of typhoid fever and one death from accident. The health of the men and the sanitary conditions of the camps were good. There was one well-fitted hospital on the work, the chief medical officer, Dr. Henderson, residing at Cochrane, and visiting the camps adjacent, and W. A. Costain, M.D., attending to the men generally. This section is about completed.

Abitibi Section East.—From about eight miles west of the Abitibi river, crossing easterly for 150 miles. This section is under contract to the Grand Trunk Construction Company, and was sub-let by them to Messrs. Foley, Welch & Stewart, who have their headquarters at Cochrane, Ont. The entrance to this work is from Cochrane, Ont. Only one hospital has lately been maintained on the work. John McCombe, M.D., is the chief medical officer, with two district medical officers as assistants.

Abitibi East Camp.—Messrs. Foley & Co., and Shea & Egan were the sub-contractors.

About 400 men were employed, who were located along the line in four camps and several house cars, and boarded and housed in wooden buildings and cars by the sub-contractors. There were no deaths. There were no serious accidents. The general health of the men and the sanitary conditions of the camps were good. One excellent hospital was maintained for these camps, located at Whitefish, within easy access of and fairly central to the construction work and camps. D. R. Cameron and D. B. Kennedy were the two resident medical officers latterly on the work, and had the assistance of Dr. T. A. Brandon in the early part of the season. This work is now about completed.

Ontario and Quebec Section.—From the easterly limit of the Abitibi East Section, sub-let to Messrs. Foley, Welch & Stewart, to a junction with the Quebec West Section at Weymontachene, Que., about 250 miles. This work is under direct contract to

Messrs. Macdonnel & O'Brien, and entrance thereto is over their other contracts for the Transcontinental, lately completed by them from Hervey Junction, Que. John McCombe, M.D., is the chief medical officer of the work.

Ontario and Quebec Camps.—Messrs. F. Munro & Co., Macdonnell Co., M. McCarthy, C. L. Hervey, Craig & Thompson, Doheny & Gordon, Frank Waters, Hugh Grant, H. McKinnon, Donovan & Co., are the sub-contractors.

About 2,085 men are employed, who are located along the line in nineteen camps, and boarded and lodged in wooden buildings by the sub-contractors.

There were two cases of typhoid, one of scabies and one of smallpox. There were two deaths, one being from typhoid and one by falling off train. The general health of the men and the sanitary conditions of the camps were good.

Three hospitals were maintained for these camps: No. 1, being a very large main hospital, with four separate wards, and located alongside the track about four miles west of La Tuque; No. 2, is located at the end of steel, and is an hospital car which is moved along the line as the work of laying steel progresses; No. 3, is located at East Cache, as convenient as possible for the west comps of the work.

Doctors Thos. H. Jackson, T. L. Raymond and W. F. Luton are the district medical officers of the work, one residing in each hospital. John McCombe, M.D., the chief medical officer of the work, resides at the St. Maurice hospital, four miles west from La Tuque, and takes charge of and gives the work his general supervision.

Quebec Section East, District 'B.'—From a point near the Quebec bridge easterly for a distance of 150 miles. This section is under contract to Messrs. M. P. and J. T. Davis, of Quebec, and is completed with the exception of the steel.

Notre Dame du Lac Camps.—Messrs. Cavicchi & Pegano, are the sub-contractors.

About 100 men were employed and were located in two camps, and boarded and housed in good board buildings by the sub-contractors. There were no contagious diseases, no deaths and no serious accidents. The health of the men was excellent, and the sanitary conditions of camps, good. J. B. Pregay, M.D., was the district medical officer of the work.

New Brunswick Section, District 'A.'—From a point near Grand Falls, westerly to the boundary between the provinces of New Brunswick and Quebec, a distance of about sixty-two miles. This was let to Messrs. Lyons & White, who have made their headquarters at Edmundston, N.B., and have sub-let the work to various sub-contractors, who had about 150 men employed and located in camps. There had been no contagious or infectious diseases or deaths. The general health of the men and the sanitary conditions of the camp had been good.

The General hospital at St. Basile, N.B., is used. Drs. J. A. Guy, and A. M. Sarmony were the district medical officers. The camps have been closed down since November last, but the work is not yet completed.

Grand Falls Section, District 'A.'—From a point near Grand Falls, N.B., to Plaster Rock, N.B., 31½ miles. This is under contract to the Willard Kitchen Company, who have their headquarters at Grand Falls, N.B.

Grand Falls Camps.—Messrs. Johnson Bros. & Whitehead Bros., are the sub-contractors.

About 150 men were employed by the Dominion Bridge Company, on bridge-work, who are located in two camps, and housed and boarded by the company in wooden buildings. There had been no contagious or infectious diseases, or serious accidents, the general health of the men being excellent and the sanitary conditions of the camps good.

A temporary hospital is maintained at Grand Falls, B. A. Puddington, M.D. is the district medical officer of the work, which is well advanced, but was closed down for the past winter, with the exception of bridge workers.

Chipman Section, District 'A.'—From Chipman, N.B., east eight miles. John W. McManus Company are the contractors. There was one camp with about 45 men employed, who were housed in log and board buildings, boarding themselves or boarded by the contractors. There had been no cases of typhoid fever, no deaths. The general health and sanitary conditions were fairly good. H. B. Hay, M.D., is the medical officer of the work, and his hospital at Chipman is used.

The total mileage of the National Transcontinental between Moncton and Winnipeg is about 1,804 miles. Between the two cities there has been laid to date by the contractors, including sidings about 1,475 miles of steel, and about eighty per cent of the work has been completed. The work was divided into six districts known as A, B, C, D, E, F. and contracts were given out for each district to chief contractors, with their headquarter address as follows:

DISTRICT A.

Corbitt Floesch Company, Fredericton, N. B., 50 miles.
J. W. McManus & Company, Chipman, N. B., 8 miles.
Toronto Construction Company, Toronto, Ont., 106 miles.
Willard Kitchen Company, Fredericton, N. B., 32 miles.
Lyons & White, Ottawa, Ont., 61 miles.

DISTRICT B.

M. P. & J. T. Davis, Ottawa, Ont., 197 miles.
Macdonnel & O'Brien, Montreal, Que., 107 miles.

DISTRICT C.

Macdonnel & O'Brien, Montreal, Que., 115 miles.
Foley, Welch & Stewart, Winnipeg, Man., 78 miles.

DISTRICT D.

Foley, Welch & Stewart, Winnipeg, Man., 72 miles.
E. F. & G. E. Fauquier, Ottawa, Ont., 100 miles.
M. P. & J. T. Davis, Ottawa, Ont., 44 miles.

DISTRICT E.

M. P. & J. T. Davis, Ottawa, Ont., 160 miles.
E. F. & G. E. Fauquier, Ottawa, Ont., 75 miles.
O'Brien & McDougall, Ottawa, Ont., 21 miles.

DISTRICT F.

O'Brien & McDougall, Ottawa, Ont., 130 miles.
J. D. McArthur, Winnipeg, Man., 247 miles.

The work on the National Transcontinental must be classed as among the very finest of railway construction, and the above facts indicate clearly the progress that has been made on the national undertaking.

Canadian Northern Ontario Railway, Port Arthur, Sudbury Section.—This road is being built by Messrs. Mackenzie, Mann & Co., from Port Arthur to Ruel, Ont., a distance of about 550 miles, and when completed is to form part of the Canadian Northern Transcontinental line from the Pacific to the Atlantic oceans.

Messrs. Foley, Welch & Stewart and the Northern Construction Co., are the chief contractors. Messrs. Mackenzie & Mackenzie, M.D.'s are the chief medical officers of all the work, and have their headquarters at Winnipeg.

Loon Camps.—Port Arthur to Reel Rock, a distnace of 60 miles, P. T. Walsh was the contractor, with eight sub-contractors, each for short distances, under him about 1,450 men were employed, who were located in twelve camps distributed along the route, and were housed and boarded in log or wood buildings by the various sub-contractors.

There had been no contagious or infectious disease, one serious accident and four deaths, three from general debility, and one from explosion. The general sanitary conditions and the water supply were only fair, but the general health of the men had been good.

The St. John Hospital at Port Arthur and the Nipigon Hospital at Nipigon, these being at each end of the work, were used as there is rail service over the Canadian Pacific line.

W. S. Hodgins, M.D., was the district medical officer on the work.

Nipigon Camps.—From Nipigon northeast about 90 miles. The Nipigon Construction Co., were the contractors with eleven sub-contractors under them. About 1,465 men were employed, who were located in fourteen camps, distributed along the route, and who were housed and boarded in wooden buildings, by and with whom they were employed.

There had been no contagious or infectious diseases, one fatal accident and nine deaths, three from pneumonia, and six from dynamite explosion. The general sanitary conditions were very good, the water supply excellent, and the general health of the men good.

There were two good hospitals, one at Nipigon, and one at Orient Bay. S. A. Mills, M.D., was the medical superintendent of the whole contract, and resided at the Nipigon Hospital, and C. E. McCutcheon, M.D., travelled the line of camps north from Nipigon.

Nimigos Camps.—From mile 155 to 209, Foley Bros., were the contractors with seven sub-contractors under them.

About 400 men were employed, who were located in seven camps situated along the route, and were housed and boarded in wooden buildings by the sub-contractors.

There had been no serious diseases or deaths, the sanitary conditions and the general health of the men having been good and the water supply excellent.

A good hospital was maintained at Nimigos, and E. L. McIntyre, M.D., was the district medical officer of the camps, and resided at the hospital.

Missanabie Camps.—From mile 209 to 265. Foley Bros. were the contractors, and had seven camps located along the route. About 160 men were employed, and were housed and boarded by the said contractors in wooden buildings.

There had been no serious diseases or accidents, and no deaths, the general sanitary conditions being fair and the health of the men good.

There was a good hospital maintained at mile 233, and E. S. Bissill, M.D., resided thereat, and was the district medical officer of the work.

Magpie Camps.—From mile 265 to 320. Foley Bros., were the contractors and had seven camps located along the route. About 150 men were employed who were housed and boarded in wooden buildings by the contractors.

There had been no contagious or infectious diseases, no serious accidents and one death from pneumonia.

The sanitary conditions were fair, the water excellent, and the health of the men good. A good hospital was maintained at mile 300, and R. T. L. Tucker resided thereat, and looked after the men at the several camps.

Ruel Camps.—These are the extreme easterly end of the whole contract, and the work runs west from Gowganda Junction, the terminus of the present branch line being operated west from Sudbury, Ont. Foley Bros. were the contractors and had fourteen camps located along the route.

About 550 men were employed, who were housed and boarded in wooden buildings by the contractors.

There had been no contagious or infectious diseases, there was one serious accident, and four deaths, one from pneumonia and three from a dynamite explosion. The general sanitary conditions were fair, the water supply excellent and the general health of the men good.

There were two hospitals maintained on the work one at mile 70, and one at mile 125, and the Sudbury hospital was used if thought beneficial. E. M. Burroughs, M.D., was the district medical officer, assisted by Dr. Weir.

Section Between Sudbury and Ottawa.—This is another section of the Transcontinental line, and is under contract from Sudbury to Pembroke, by Angus Sinclair, C.E., as chief contractor, J. Mitchell, M.D., of Toronto, is medical superintendent of this section.

Onwatin Camps.—There are six sub-contractors, having in all seven camps and employing about 400 men,who are housed and boarded in wooden buildings by the said sub-contractors. There had been no contagious or infectious diseases and no deaths. There were three serious accidents, but none fatal. The general health of the men, the sanitary conditions of camps, and the water supply was good.

The St. Joseph's hospital at Sudbury was used. W. N. Robertson, M.D.C.M., was the district medical officer of the camps.

North Bay Camps.—There are three sub-contractors with one camp each, and about 200 men are employed, who are housed and boarded in wooden buildings. There had been no contagious or infectious diseases, deaths or serious accidents, and the health of the men and the general sanitary conditions of camps were good.

Dr. Campbell of North Bay was the district medical officer of these camps.

Mattawa Camps.—There were three sub-contractors on this work with three camps. About 400 men were employed, who were housed and boarded in wood buildings by the sub-contractors.

There were no serious diseases, deaths or accidents, the general health of the men being good, and the sanitary condition fair. There was a small hospital on the work, and one at Mattawa for major cases. N. B. Taylor, M.B. F.R.C.S., Ed., was the district medical officer of the work.

THE ALGOMA CENTRAL AND HUDSON BAY RAILWAY.

Main Line Extension.—From mile 68 to a connection with the Canadian Pacific railway at Hobon, Ont., thence to a connection with the Canadian Northern railway at Oba Lake, and thence to a connection with the Transcontinental railway at Hearst, Ont. The O'Boyle Bros'. Construction Co., the Superior Construction Co., Ltd., of Sudbury, Ont., and W. Kennedy of Sudbury, Ont., were the chief contractors.

About 2,250 men were employed who were located in thirty-six camps distributed along the route, and were housed and boarded in wooden buildings by the various sub-contractors or the Federal Commissary and Supply Company.

There were four cases of typhoid fever and one death from pneumonia. The general health of the men, and the sanitary conditions of the camps were good. There were a few minor but no serious accidents. Four good hospitals with nurses are maintained on the work, viz. at Hobon, Missanabie, Oba Lake, Hearst and another is under construction further out on the work.

R. McLean, M.D., of Sault Ste. Marie, Ont., is the chief medical officer, and has had the following assistants on the work during the year as district medical officers, viz.: Doctors P. J. Kennedy, H. Mohan, W. A. Strickland and G. B. Kindrick.

Michipicoten Branch.—From Michipicoten Harbour, southeast towards Sault Ste Marie, O'Boyle Bros. Construction Company were the chief contractors, with Lynch, Peckham & Gorman, Hicks & Furlong, and Hartz & McDougald as the sub-contractors.

About 600 men were employed, located in three camps and housed and boarded in log buildings by the sub-contractors. There were two cases of typhoid fever, and two cases of varioloid smallpox, but no deaths. There were two serious accidents, but none fatal. There is an hospital within easy reach of the camps. Jas. R. McLean, M.D., is the chief medical officer of the work, and W. G. Cook, M.D., is the resident and district medical officer on the work.

Algoma Eastern Branch.—From Little Current, Ont., north to Whitefish, &c. The Superior Construction and the O'Boyle Bros. Construction Company were the chief contractors and sub-let the same in small contracts.

About 1,600 men were employed, who were located in twenty-one camps along the route, and were housed and boarded in log buildings by the sub-contractors. There were twenty-two cases of typhoid fever and one of measles. There were four deaths, one from apoplexy, one from diphtheria, one from drowning and one from injury by dynamite. The general health of the men, and the sanitary condition of the camps were good.

The General hospital at Sudbury or at Sault Ste. Marie were used when necessary. Jas. R. McLean, M.D., is the chief medical officer of the work, and had as assistants at the camps, Doctors J. C. Kidd, H. A. Turopsky, Wm. H. Ochs, J. H. Blucker and W. E. Wilkins.

GEORGIAN BAY AND SEABOARD RAILWAY.

Canadian Pacific Railway Construction.—From Victoria Harbour, Ont., to Bethany, Ont., 88 miles. J. S. Metcalf & Co., H. Willwood and the Toronto Construction Company were the sub-contractors.

About 550 men were employed, located in six camps along the route and looked after by local doctors residing in the neighbourhood. There were no serious diseases, but there were two deaths, one from pneumonia and one from accident.

This work is now about completed.

QUEBEC AND SAGUENAY RAILWAY.

Messrs. O'Brien & Doheny were the chief contractors, with headquarters at Quebec. The contract was for about fifty-five miles from Cap Tourmente to Pointe-à-Pic, P.Q.

About 1,000 men were employed, who were housed and boarded in good quarters by the sub-contractors of whom there were twelve in number.

There was one case of smallpox and eleven cases of typhoid fever. There were four fatal accidents and six deaths, two from explosions, two from drowning and two from typhoid fever. The general health of the men was good, and the sanitary condition of the camps excellent, the tide washing away all garbage.

The Sisters' hospital at Baie St. Paul, and the Jeffrey Hale hospital at Quebec were used, patients being transferred thereto on the steamer *Thorn* belonging to the contractors, and which is used continually on trips between camp points.

John McCombe, M.D., is the chief medical officer of the work, and the district medical officers assisting him were Dr. Arthur Fournier of St. Anne de Beaupre, Dr. E. Tremblay of Baie Ste. Paul, and Dr. James Benny, who visits the camps below Dr. Tremblay's district. This work was closed down for the winter.

On the above public works which cover the territory east from Winnipeg, Man., during the twelve months reported on, there was an average of 17,155 men employed, with 55 qualified medical officers in charge of camp hospitals and camps.

Cases of contagious and infectious diseases—

Diphtheria	1
Erysipelas	2
Scabies	1
Measles	1
Smallpox	4
Typhoid fever	58

Causes of deaths as under—

Pneumonia	6
Apoplexy	1
Syncope	1
Acute phthisis	1
Gangrene	1
Diphtheria	1
Metean scinosis	1
Typhoid fever	6
General debility	4
Drowning	3
Accident	2
Jumping off train	1
Killed by cars	1
Killed by falling earth	1
Killed by derrick	1
Crushed by pile	1
Dynamite explosions	18
Total deaths as above	50

In closing this report for the past twelve months, I am pleased to be able to draw your attention to the fact that although the number of men employed shows a considerable increase, the cases of typhoid fever have been decreased almost one half, and the deaths fewer than those reported in the previous year. This I consider as due to the sanitary conditions in which the camps were kept, and the care and attention given by the contractors and medical officers in carrying out sanitary conditions, and such clauses of the regulations of the Public Works (Health) Act, 1899, as applied thereto.

In concluding this report, I beg to suggest for your attention, that for the benefit and convenience of contractors and district medical officers of camps, and for the

welfare of employees on public works, that the regulations at present applying under the said Act, be amended within as little delay as possible.

I have the honour to be, sir,
Your obedient servant,

CHAS. A. L. FISHER,
Public Works Health Inspector.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 15.

(A. E. Clendenan, M.D.)

Edmonton, Alta., March 27, 1912.

Sir,—I have the honour to submit my report for the year ended March 31, 1912, as Public Works Health Inspector. The following is a list of the public works of western Canada, noting the contracts, the medical service supplied, and comments on local conditions. On the whole, there have been few cases of contagious or infectious diseases, with the exception of the Grand Trunk Pacific on the eastern slope of the Rocky mountains. They have had the experience of other transmountain roads in this respect, making it strongly suggestive that the typhoid bacillus is indigenous in the district. A contagious disease known as hoof-rot in horses, also infects the men in a few cases. Both these diseases affect horses and men alike in the area mentioned.

The standard of camp construction and of grade hospitals and the merits of the medical men are in advance of last year and the year before. The old charge of fifty cents on prairie work and seventy-five cents on rock work has advanced everywhere to seventy-five cents and one dollar respectively. The quality of the service requested by employees and demanded by your inspector cannot be furnished at less than present deductions from wages. The cards which the Public Works Health Act declares shall be posted in camps are practically never put up. The clause specifying the minimum charge creates such a dissension among employees that neither medical men nor contractors will have the cards exposed.

The custom of erecting telephone lines along the right-of-way of important railroad contracts has greatly improved the medical service. Few complaints have been received, and those on investigation, while having some merit, had behind them other motives than a public health grievance.

A clause ought to be inserted without delay in the Railway Act to punish by fine or imprisonment the putting off of dynamite without giving warning. A great indifference to the menace that blasting is to neighbours and travellers, is shown by many contractors and especially station-men on railroad work. The engineers warn them, and the police find themselves impotent to prosecute owing to lack of authority. The British Columbia provincial acts do not cover the point.

The Skeena river which is followed by the Grand Trunk Pacific from Prince Rupert inland does not lend itself to a public highway during the winter season for one hundred and sixty-five miles, so as soon as the grade is passable, it becomes the only roadway. Practically all traffic is related to railroad construction. One hundred miles was graded and ballasted at the time of my visit and steel was being laid on the remainder. There is a general order of the Railway Commission not to carry passengers on skeleton tracks. Workmen were being engaged and shipped to the end

of the completed roadbed in an inhospitable part of the country, where there were no comforts, and but the barest necessities, if they had money and their own bedding. Over this sixty-five miles of track, men had to either walk and carry their luggage or affect to steal a ride on construction trains, for the freight conductors had emphatic orders from the divisional superintendent at Prince Rupert not to let any person ride. I saw as many as twenty-six men 'beating their way' on one train from one construction train to the next as the railroad crews connected and passed material cars along. The ties and flat cars are more or less icy in the winter, yet all these men stayed out riding through the cold wintry night on top of high loads of ties that frequently shift en route. They had to do it, or make their way back without a pass and in most cases, to return was impossible. Whenever the trains met at a siding where there was no shelter, all hands were put off on the right-of-way. On one night observed, the men mentioned above, tramped up and down from 3 a.m. until 11 a.m., and could get nothing to eat until 12.30 p.m. This condition occurs in a more or less aggravated form every time there is an advance made in track-laying. It is quite unnecessary.

Canadian Northern Railway—Port Mann to Kamloops, B.C.—Contractors Northern Construction Company, in charge of medical service is Dr. Robert MacKenzie, Vancouver, B.C., with six doctors on the line, and five hospitals.

Canadian Northern Pacific Railway—Victoria, B.C. to Alberni.—Contractors, Grant, Smith & Company. In charge, medical service, Dr R. MacKenzie, with two doctors assisting, and two hospitals on the line.

Kettle Valley Railway.—Contractors, MacDonald, Gzomski Company, and L. M. Rice & Company, medical service by Dr. Ker, with three assistants and three hospitals.

Canadian Northern Railway—Stettler to Rocky Mountain House.—Contractors, Northern Construction Company. In charge of medical service, Dr. Chas. MacKenzie, Winnipeg, Man. Two doctors on line, and two hospitals.

Canadian Pacific Railway, Castor to Sixty Miles East.—Contractor, Frank Jackson. In charge of medical service, Dr. McPherson, Castor.

Central Alberta Railway.—Contractors, Archibald & Co. In charge medical service, Dr. Jamieson, Red Deer, assisted by one doctor. Two hospitals.

Canadian Pacific Irrigation Co.—Contractors, Janse, McDonald & Co. In charge of medical service, Drs. Ker and Hazard, Calgary, with two assistants and two hospitals.

Canadian Northern Railway, Vegreville-Calgary.—Contractors, John Breckenridge. Dr. Jardine in charge, with one hospital.

Southern Alberta Irrigation Co.—Contractor, D. F. McArthur. Two doctors and one hospital in service.

Canadian Northern Railway, Camrose to Strathcona.—Contractors, Cowan Construction Co. In charge of medical service, Drs. Stewart and Smith, with one hospital.

Canadian Pacific Railway, Elko to Waldo, B.C.—Contractor, Janse McDonald & Co., in charge Dr. Saunders, with hospital at Fernie, under Drs. Corson and Bonnell.

Kootenay and Alberta Railway Company, Pincher Creek to Beaver Creek.—Contractors, Grant, Smith & Co. On medical service, Dr. Turcott, with one hospital.

Canadian Pacific Railway, in Strathcona.—Contractor, D. Fitzgerald. In charge medical service, Dr. Archibald, with one hospital.

Grand Trunk Pacific Railway, Tofield, Calgary Line.—Contractor, Geo. H. Webster. In charge of medical service, Dr. Jas. Thompson, with one hospital.

Canadian Northern Railway, North Battleford, Athabaska Landing.—Contractor, Jas. W. Millar; Dr. J. H. Jackson, with one hospital, in charge.

Grand Trunk Pacific Railway, Oben-Battleford.—Contractor, J. Dandelin, Dr. Stanley Miller, with one hospital in charge of medical service.

Grand Trunk Pacific Railway, Young-Prince Albert.—Contractor, J. D. McArthur & Co., Dr. R. D. Scott, with one hospital in charge.

Grand Trunk Pacific Railway, Rossburn Extension.—Contractor, Malloy Bros., Dr. E. M. Vesey with one hospital in charge of medical service.

Canadian Northern Main Line West of Edmonton.—Contractors, Cowan Construction Co. In charge of medical service, Dr. Chas. MacKenzie, with four doctors and three hospitals on work.

Grand Trunk Pacific Railway, Brazeau Branch.—Contractors, Phelan & Shirley. In charge of medical service is Dr. Shilabeer, with one hospital.

Canadian Northern Railway, Grande Prairie Line.—Contractor, Northern Construction Company. In charge of medical service is Dr. J. A. Reid, with one hospital.

Canadian Pacific Railway, Ogema Line.—Contractor, Mr. Lamoureux. Dr. Allen with one hospital, in charge.

Grand Trunk Pacific Railway, Moosejaw Line.—Contractors, Rigby, Hyland and Plummer. On inspection I found no medical service had been provided by the contractors. On receiving instructions, Dr. Bawden with a hospital in Moosejaw was employed.

Grand Trunk Pacific Railway, Regina-Frobisher Branch.—Contractor, D. F. MacArthur. Dr. Thompson, with one hospital and one assistant, on the work.

Canadian Northern Railway, Maryfield-Moosejaw.—Contractor, Cowan Construction Co. The medical service is furnished by Dr. Chas. MacKenzie, who has one doctor and one hospital.

Canadian Northern Railway Co.—Contractors, Northern Construction Co. Dr. Oliver, and one hospital on the work.

Canadian Northern Railway Co., McLeod-Pincher.—Contractor, Cowan Construction Co. In charge of medical service is Dr. Chas. MacKenzie, with one doctor and one hospital on the work.

Grand Trunk Pacific Railway, Battle River and Cut Knife Bridges.—Contractor, John Gunn, Dr. Stanley Miller, with one hospital in charge.

Canadian Northern Railway, Pembina Bridge.—Contractor, C. H. Kenny & Co. In charge, Dr. Reid, with one hospital.

Grand Trunk Pacific Railway.—Contractors, Foley, Welsh & Stewart. In charge of medical service is Dr. Richardson, with two assistants, and two hospitals on main line through Yellowhead Pass.

Esquimalt and Nanaimo.—Contractors, Moore and Pethick. In charge of work is Dr. R. MacKenzie with one doctor and one hospital on the line.

Grand Trunk Pacific Railway, Main Line, Prince Rupert End.—Contractors, Foley, Welsh & Stewart. In charge of medical service is Dr. Ewing, with three men and three hospitals on the work.

A. E. CLENDENAN, M.D.,
Public Works Health Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

APPENDIX No. 16.

SPECIAL MANGE ORDER FOR ALBERTA AND SASKATCHEWAN.

By Order in Council dated 8th June, 1911.

Whereas the disease of Mange exists among cattle throughout those portions of the Provinces of Saskatchewan and Alberta which may be described as bounded by the International Boundary, the Rocky Mountains and a line drawn as follows:—

A line from the Rocky Mountains along the northern boundary of the Stoney Indian Reserve to the line between ranges 5 and 6 west of the 5th meridian, thence north along that line to the line between townships 40 and 41, thence east along that line to the 4th principal meridian, thence south along the 4th principal meridian to the Red Deer River, thence along the Red Deer and Saskatchewan rivers to the line between ranges 7 and 8 west of the 3rd meridian, thence south along that line to the International boundary.

Therefore, His Excellency in Council is pleased, in virtue of the provisions of Chapter 75, of the Revised Statutes of Canada, 1906, to order that the annexed regulations relating to Mange in cattle in certain portions of the Provinces of Saskatchewan and Alberta, shall be and the same are hereby established.

Regulations.

CATTLE FOR SHIPMENT OUTSIDE THE AREA FOR PURPOSES OTHER THAN IMMEDIATE SLAUGHTER.

1. Cattle intended for grazing, feeding, breeding purposes or milk production, *or any purposes other than immediate slaughter* shall not be removed or be allowed to move out of the above described tract, nor shall any railway company accept or load any such cattle for shipment, unless they are accompanied by the certificate of a regular salaried Veterinary Inspector of the Department of Agriculture stating that they are free from disease and that they have been, within a period of thirty days immediately preceding the date of shipment, treated under the supervision of a regular salaried Veterinary Inspector and in a manner satisfactory to him, and that they have not, since being so treated, been exposed either directly or indirectly to the contagion of Mange.

CATTLE FOR IMMEDIATE SLAUGHTER OUTSIDE THE AREA OR FOR EXPORT TO EUROPE.

2. Cattle intended for immediate slaughter or for export to Europe shall not be removed or allowed to move out of the above described tract nor shall any railway company accept or load any of such cattle for shipment, except under the following conditions:—

(a) Cattle, *other than those consigned to Winnipeg or to points in Canada east of Winnipeg,* shall be removed or allowed to move out of the above described tract, either by rail or otherwise, only when accompanied by the certificate of a Veterinary Inspector of the Department of Agriculture, stating that they have been examined by him and have been found free from infection of Mange and other contagious disease.

(*b*) Cattle, *consigned to Winnipeg or to points in Canada east of Winnipeg,* whether originating within the above described tract or not, shall be inspected at Winnipeg, and no railway company shall release such cattle at Winnipeg, or load such cattle for re-shipment therefrom, until they have been submitted by daylight

to a Veterinary Inspector of the Department of Agriculture and certified by him to be free from Mange and other contagious disease.

(*c*) Cattle found on inspection to be affected with Mange or other contagious or infectious disease shall, except as hereinafter provided, be dealt with as may be ordered by the Veterinary Iuspector.

INFECTED CATTLE FOR IMMEDIATE SLAUGHTER WITHIN THE AREA.

3. Cattle showing evidence of Mange, originating in a place which has been declared to be an infected place, may be removed therefrom for shipment by rail for slaughter at a given destination within the quarantined area only, in the judgment of a regular salaried Veterinary Inspector who, if he sees fit, may issue a license for such removal, as provided in Section 23 of the Animal Contagious Diseases Act.

4. In the event of any cattle affected with Mange but which have not originated in a place declared to be an infected place being presented for shipment by rail such cattle, together with any others with which they have been in contact, shall be immediately detained and isolated, or may, if the Veterinary Inspector sees fit, be shipped, under the conditions hereinafter set forth, to a slaughter house within the area properly equipped as hereinafter provided, for immediate slaughter only. The Veterinary Inspector shall immediately report the matter to the nearest regular salaried Veterinary Inspector of the Department who shall thereupon take such further action as may appear to him to be necessary.

5. The loading of the above classes of cattle must be personally supervised by an Inspector who must see that the cars conveying them are duly billed to a slaughter house as above provided and that the said cars bear the placard required by Section 7 of this Order.

(*a*) The Inspector at the point of shipment shall also notify by telegraph the inspector at the point of destination of the fact that the cattle are being forwarded.

(*b*) Unless loaded through special yards and chutes reserved exclusively for such shipments, all yards and chutes, weigh scales or other appliances with which they have been in contact shall be declared infected places and shall not again be used until cleansed and disinfected to the satisfaction of an inspector; such cattle shall not be allowed to come in contact with other animals; shall be consigned direct only to slaughter houses within the hereinbefore described tract as are provided with private yards and chutes; shall not be unloaded at any point en route, and *shall under no pretext whatever, be removed alive from the slaughter house or the yards and premises immediately connected therewith.*

GENERAL PROVISIONS REGARDING SHIPMENT.

6. All waybills and bills of lading accompanying shipments of cattle originating within the said tract, other than those shipped under the provisions of Section 1 of this Order shall have plainly written or stamped across the face thereof a notification that the cars conveying such shipments are to be cleansed and disinfected after being unloaded, and before being again used.

7. All cars conveying such cattle must bear a placard having clearly printed thereon, in letters not less than six inches long, the words "*cattle for immediate slaughter only.*" Such cards shall in no case be removed unless and until the cars have been cleansed and disinfected after being unloaded at final destination.

(*a*) When cattle shipped to United States points are transferred to United States cars, such cars shall also bear a similar placard, but the placards shall not be removed from the Canadian cars unless and until the cars have been cleansed and disinfected under official supervision.

8. At points where cattle originating in the said tract, other than those provided for in Section 1 of this Order, are unloaded they shall be placed in special yards, and such yards shall be used for no other purpose and shall be cleansed and disinfected when so ordered by an Inspector.

9. Cars conveying such cattle shall be cleaned and disinfected to the satisfaction of an Inspector after being unloaded and before being again used.

10. Cattle shipped for immediate slaughter or for export shall not be sold or otherwise disposed of for any other purpose.

THE TRANSIT OF CATTLE THROUGH THE AREA.

11. The transit of cattle through the said tract is permitted, subject to the following regulations:—

(*a*) Cattle passing by rail through the said tract from one part of Canada to another, shall, at points where unloading is necessary, be placed in yards specially reserved for this purpose, and *shall not be permitted to come either directly or indirectly in contact with cattle which have originated within the said tract,* other than those provided for in Section 1 of this Order.

(*b*) Cattle imported from the United States into the said tract destined for points in Canada outside thereof may, under compliance with the Quarantine Regulations, and with the provisions of the next preceding paragraph hereof, be permitted to pass without unnecessary delay through the said tract direct to their destination without further restrictions.

12. Any infraction of these provisions shall be deemed an infraction of the Animal Contagious Diseases Act and dealt with accordingly.

13. The Minister is hereby empowered to make such alterations in the boundaries of the quarantined area defined by this Order as may from time to time seem to him necessary or advisable.

APPENDIX No. 17.

SPECIAL MANGE ORDER FOR BRITISH COLUMBIA.

By Order in Council dated 8th June, 1911, as amended by Ministerial Order July 5th, 1911.

Whereas the disease of Mange exists among cattle throughout that portion of the Province of British Columbia which may be described as bounded by a line drawn as follows:—

Beginning at the mouth of the North Thompson River, thence north along the said river to the line between townships 22 and 23, thence easterly along the line between townships 22 and 23, to the northwest corner of township 22, range 11, thence south along the line between ranges 11 and 12, to the southern boundary of the railway belt, thence westerly along the southern boundary of the railway belt to the line between ranges 17 and 18, thence northerly along the line between ranges 17 and 18, to the South Thompson River, thence east along the South Thompson River to the place of beginning.

Therefore His Excellency in Council, in virtue of the provisions of Chapter 75 Revised Statutes of Canada, 1906, is pleased to make and establish the following regulations relating to Mange in cattle in certain portions of the Province of British Columbia, and the same are hereby made and established accordingly.

Regulations.

1. Cattle intended for grazing, feeding, breeding purposes or milk production, *or any purpose other than immediate slaughter,* shall not be removed or be allowed to move out of the above described tract, nor shall any railway company accept or load any such cattle for shipment, unless they are accompanied by the certificate of a regular salaried Veterinary Inspector of the Department of Agriculture stating that they are free from disease and that they have been, within a period of thirty days immediately preceding the date of shipment, treated under the supervision of a regular salaried Veterinary Inspector and in a manner satisfactory to him, and that they have not, since being so treated, been exposed either directly or indirectly to the contagion of mange.

2. Cattle *intended for immediate slaughter* shall not be removed or allowed to move out of the above described tract, nor shall any railway company accept or load any such cattle for shipment, unless they are accompanied by the certificate of a Veterinary Inspector of the Department of Agriculture, stating that they have been examined by him and found free from Mange or any other contagious disease.

3. The Inspector at the point of shipment shall notify by telegraph the Inspector at the point of destination of the fact that the cattle are being forwarded.

4. Cattle found on inspection to be *affected with mange* shall not be removed or permitted to move out of the above described tract *under any pretext whatever,* except that by the authority and under the supervision of a Veterinary Inspector of the Department of Agriculture, such cattle may be moved to points within the area *for immediate slaughter.*

5. Such cattle shall not be allowed to come in contact with other animals; shall be consigned direct only to such slaughter houses within the hereinbefore described tract as are provided with private yards and chutes; shall not be unloaded at any point en route, and shall *under no pretext whatever, be removed alive from the slaughter house or the yards and premises immediately connected therewith.*

6. When cattle are shipped for immediate slaughter they shall not be sold or otherwise disposed of for any other purpose.

7. All way-bills and bills-of-lading accompanying shipments of cattle originating within the said tract, other than those shipped under the provisions of Section 1 of this Order, shall have plainly written or stamped across the face thereof a notification that the cars conveying such shipments are to be cleansed and disinfected after being unloaded, and before being again used.

8. All cars conveying such cattle must bear a placard having clearly printed thereon in letters not less than six inches long, the words "*cattle for immediate slaughter only.*" Such cards shall in no case be removed unless and until the cars have been cleansed and disinfected after being unloaded at final destination.

9. Unless loaded through special yards and chutes, reserved exclusively for such shipments, all yards and chutes, weigh scales and other appliances with which they have been in contact shall be declared to be infected places, and shall not again be used until cleansed and disinfected to the satisfaction of an Inspector of the Department of Agriculture.

10. Cars conveying such cattle shall be cleansed and disinfected to the satisfaction of an Inspector after being unloaded and before being again used.

11. Cattle for transit by rail through the said tract from one part of Canada to another, shall, at points where unloading is necessary, be placed in yards specially reserved for this purpose, and shall not be permitted to come in contact with cattle which have originated within the said tract, other than those provided for in Section 1 of this Order.

12. Any infraction of these provisions shall be deemed an infraction of the Animal Contagious Disease Act and dealt with accordingly.

13. The Minister is hereby empowered to make such alterations in the boundaries of the quarantined area defined by this Order as may from time to time seem to him necessary or advisable.

APPENDIX No. 18.

REGULATIONS RELATING TO HOG CHOLERA AND SWINE PLAGUE.

By Order in Council dated 8th June, 1911, in virtue of "The Animal Contagious Diseases Act, R.S.C., 1906.

1. No hog which is or has been affected with, or which has been exposed to hog cholera or swine plague, shall be permitted to run at large, or to come in contact with any hog which is not so affected.

2. Any inspector may declare to be an infected place, within the meaning of the Animal Contagious Diseases Act, any place or premises where the infection of hog cholera or swine plague is known or suspected to exist.

3. No hog or other animal, nor any portion or product thereof, shall be removed out of a place so declared to be an infected place, without a license signed by an Inspector.

4. Inspectors are hereby authorized to inspect any hogs affected with hog cholera or swine plague, or suspected of being so affected, or which have been in contact with animals so affected or suspected of being so affected, or which have been in any way whatsoever exposed to the contagion of hog cholera or swine plague, and for the purpose of making such inspection may order any such animals to be collected, detained or isolated.

5. The expenses of, and incidental to the collection, isolation, seizure, or otherwise dealing with animals for the purpose of these regulations shall be borne by the owners of the animals, and no indemnity shall be allowed to the owner in case of damage arising out of or resulting from such actions, except as hereinafter provided.

6. Hogs affected with hog cholera or swine plague, or which have been in contact with or in close proximity to hogs affected with hog cholera or swine plague, shall on an order signed by an Inspector duly appointed under the Animal Contagious Diseases Act be forthwith slaughtered and the carcasses disposed of as in such order prescribed, compensation to be paid to the owners of such animals if and when the Act so provides.

7. After any place or premises has been declared to be an infected place on account of the existence or suspected existence thereon of hog cholera or swine plague, no hogs shall be brought on to such place or premises, except with the authority of an Inspector until the said place or premises shall have been declared to have been free from infectious or contagious disease, as provided in section 20 of the Animal Contagious Diseases Act, and in case of the infraction of this regulation any compensation to which the owner might otherwise be entitled shall be withheld.

8. Compensation may be withheld in the case of hogs fed on uncooked garbage or kitchen refuse, or on any raw animal flesh or similar food likely to convey the infection of hog cholera or swine plague.

9. Before an order is made for the payment of compensation in any of the cases aforesaid there must be produced to the Minister of Agriculture a satisfactory report,

order for slaughter, certificate of valuation and slaughter, and certificate of cleansing and disinfection, all signed by an Inspector.

10. Every yard, stable, hog-pen, or other place or premises, and every wagon, cart, carriage, car or other vehicle, and every utensil or other thing infected or suspected of being infected with hog cholera or swine plague shall be thoroughly cleansed and disinfected by and at the expense of the owner or occupier in a manner satisfactory to an Inspector.

APPENDIX No. 19.

SEED CONTROL ACT.

Regulations made by the Governor in Council, approved under date July 5, 1911.

His Excellency in Council is pleased, in virtue of the provisions of section 2 of the Seed Control Act, 1911, to make the following regulations, and the same are hereby made and established accordingly:—

1. The species of farm weeds which shall for the purpose of this Act be included within the meaning of the term "noxious weeds" shall be as follows:—

Wild Oats (*Avena fatua* L.)
Common Darnel (*Lolium temulentum* L.)
Docks (*Rumex* species.)
Purple Cockle (*Agrostemma Githago* L.)
Campions, including White Cockle (*Lychnis alba* Mill), Night-flowering Catchfly (*Silene noctiflora* L.) and Bladder Campion (*Silene latifolia* (Mill) Britten and Rendle.)
Cow Cockle (*Saponaria Vaccaria* L.)
Stinkweed (*Thlaspi arvense* L.)
False Flax (*Camelina* species).
Ball Mustard (*Neslia paniculata* (L.) Desv.)
Wild Radish (*Raphanus Raphanistrum* L.)
Wild Mustard (*Brassica arvensis* (L.) Ktze) and other wild Brasica species.
Hare's-ear Mustard (*Conringia orientalis* (L.) Dumort).
Tumbling Mustard (*Sisymbrium altissimum* L.)
Wild Carrot (*Daucus Carota* L.)
Field Bindweed (*Convolvulus arvensis* L.)
Dodder (*Cuscuta* species) in alfalfa seed.
Blue Bur or Stickseed (*Lappula Echinata* Gilibert).
Blue Weed (*Echium vulgare* L.)
Ribgrass (*Plantago lanceolata* L.)
Ox-eye Daisy (*Chrysanthemum Leucanthemum* L.)
Canada Thistle (*Cirsium arvense* (L.) Scop.)
Chicory (*Chicorium Intybus* L.)
Sow Thistles (*Sonchus* species.)

2. The maximum proportion of seeds of noxious weeds that may be tolerated in any other seeds without affecting their character as being free from the seeds of the said weeds within the meaning of section 6 of this Act shall be as follows:—

(*a*) For seed oats, barley, wheat or other seeds similar in size, one weed seed in one pound avoirdupois.

(*b*) For seed of flax, millet or other seeds similar in size, one weed seed in one ounce avoirdupois.

(*c*)For seed of white clover and grasses, five weed seeds in one ounce avoirdupois.

3. Nothing in these regulations shall be construed to apply to timothy, red clover, alfalfa or alsike seed that may be marked with a designation of the grade of seed "Extra No. 1," as defined in section 8, clause (*a*) of the Act.

4. The percentage standards of vitality for good seed of the various kinds of cereals, grasses, clovers, forage plants, flax, field root and garden vegetable crops, shall be as follows:—

	Percentage Germination.
For cereal grains, flax, Indian corn and millet..	95
" peas, beans and vetches..	90
" red clover, alfalfa, alsike, white and other clovers..	95
" timothy, cocksfoot and meadow fescue..	90
" all other grasses..	80
" mangel and beet (160 sprouts from 100 balls) balls	90
" turnip, swede, rape, radish, cabbage and cauliflower.. ..	90
" spinach and carrot..	80
" celery, parsley and parsnip..	65
" onion, leek and tomato..	90
" lettuce..	95
" cucumber, melon, squash and other cucurbits..	90

APPENDIX No. 20.

REGULATIONS RELATING TO SHEEP SCAB.

By Order in Council dated 22nd July, 1911, in virtue of "The Animal Contagious Diseases Act, R.S.C., 1906."

1. No sheep which is affected with, or has been exposed to the infection of Sheep Scab shall be permitted to run at large or to come in contact with any animal not so affected or exposed.

2. Any Inspector may declare to be an infected place within the meaning of "The Animal Contagious Diseases Act" any place or premises where the infection of Sheep Scab is known or suspected to exist.

3. No sheep nor any wool or other portion or product thereof shall be removed out of any place so declared to be an infected place without a license signed by an Inspector.

4. Inspectors are hereby authorized to inspect any sheep affected with Sheep Scab, or suspected of being so affected, or which have been in contact with animals so affected, or suspected of being so affected, or which have been in any way whatever exposed to the infection of Sheep Scab, and may order any such animals to be collected, detained, isolated, dipped or otherwise dealt with as may to them appear advisable.

5. The expenses of, and incidental to the collection, isolation, seizure, or otherwise dealing with animals for the purposes of these Regulations shall be borne by the owners of the animals and no indemnity shall be allowed to the owner in case of damage arising out of or resulting from such actions except as hereinafter provided.

6. Where a Veterinary Inspector so orders, no sheep shall be allowed access to any field, common, yard, stable, or other place or premises where Sheep Scab exists or has existed.

7. Premises on which animals affected with Sheep Scab have been kept, are to be dealt with at the expense of the owner or occupier in a manner satisfactory to the Veterinary Inspector.

8. Animals affected with Sheep Scab or which have been in contact with or in close proximity to animals affected with Sheep Scab, may, on an order signed by a Veterinary Inspector, duly appointed under the Animal Contagious Diseases Act, be forthwith—slaughtered and the carcasses disposed of as in such manner prescribed, compensation to be paid to the owners of such animals if and when the Act so provides but no Inspector shall order the slaughter of such animals without having first received from the Minister special authority to do so.

9. Before an order is made for the payment of compensation in any of the cases aforesaid, there must be produced to the Minister of Agriculture a satisfactory report, order for slaughter, certificate of valuation and slaughter, and certificate of cleansing and disinfection, all signed by an Inspector.

10. Any Inspector may declare any steamship, steam or other vessel, railway car or other vehicle, on or in which animals affected with or suspected of being affected with Sheep Scab, are, or have been placed for the purpose of transit, to be infected and may also declare such vessel, car or other vehicle, to be no longer infected after it has been thoroughly cleansed and disinfected in accordance with his instructions.

11. Every yard, stable, cowshed, outhouse, or other place or premises, and every wagon, cart, carriage, car, or other vehicle, and every utensil or other thing infected or suspected of being infected with Sheep Scab shall be thoroughly cleansed and disinfected by and at the expense of the owner or occupier in a manner satisfactory to an Inspector.

APPENDIX No. 21.

REGULATIONS RELATING TO ANTHRAX.

By Order in Council dated 22nd July, 1911, in virtue of "The Animal Contagious Diseases Act, R.S.C., 1906."

1. No animal which is affected with or has been exposed to the contagion of Anthrax shall be permitted to run at large or to come in contact with any animal not so affected or exposed.

2. Any Inspector may declare to be an infected place within the meaning of "The Animal Contagious Diseases Act" any place or premises where the contagion of Anthrax is known or suspected to exist.

3. No animal nor any portion or product thereof shall be removed out of any place so declared to be an infected place without a license signed by an Inspector.

4. Inspectors are hereby authorized to inspect any animals affected with Anthrax or suspected of being so affected, or which have been in contact with animals so affected, or suspected of being so affected, or which have been in any way whatever exposed to the infection of Anthrax, and may order any such animals to be collected, detained, isolated, or otherwise dealt with as may to them appear advisable.

5. The expenses of, and incidental to the collection, isolation, seizure, or otherwise dealing with animals for the purposes of these Regulations shall be borne by the owners of the animals and no indemnity shall be allowed to the owner in case

of damage arising out of or resulting from such actions except as hereinafter provided.

6. Where a Veterinary Inspector so orders no animal or animals shall be allowed access to any field, common, yard, stable, or other place or premises where Anthrax exists or has existed.

7. Carcasses of animals dying from Anthrax, or suspected Anthrax, must not be skinned, or cut in any way; such carcasses together with all litter, excreta and other articles which may have been in contact with them, must be dealt with in accordance with the orders of the Veterinary Inspector and in a manner satisfactory to him.

8. Premises on which animals affected with Anthrax have been kept are to be dealt with at the expense of the owner or occupier, in a manner satisfactory to the Veterinary Inspector.

9. Animals affected with Anthrax or which have been in contact with or in close proximity to animals affected with Anthrax, may, on an order signed by a Veterinary Inspector, duly appointed under the Animal Contagious Diseases Act, be forthwith slaughtered and the carcasses disposed of as in such order prescribed, compensation to be paid to the owners of such animals if and when the Act so provides, but no Inspector shall order the slaughter of such animals without having first received from the Minister special authority to do so.

10. Before an order is made for the payment of compensation in any of the cases aforesaid, there must be produced to the Minister of Agriculture a satisfactory report, order for slaughter, certificate of valuation and slaughter, and certificate of cleansing and disinfection, all signed by an Inspector.

11. Any Inspector may declare any steamship, steam or other vessel, railway car or other vehicle, on or in which animals affected with or suspected of being affected with Anthrax, are or have been placed for the purpose of transit, to be infected, and may also declare such vessel, car or other vehicle, to be no longer infected after it has been thoroughly cleansed and disinfected in accordance with his instructions.

12. Every yard, stable, cowshed, outhouse, or other place or premises, and every wagon, cart, carriage, car, or other vehicle, and every utensil or other thing infected or suspected of being infected with Anthrax shall be thoroughly cleansed and disinfected by and at the expense of the owner or occupier in a manner satisfactory to an Inspector.

APPENDIX No. 22

REGULATIONS RELATING TO MANGE.

By Order in Council dated 22nd July, 1911, in virtue of "The Animal Contagious Diseases Act, R.S.C., 1906."

1. No animal which is affected with or has been exposed to the infection of Mange shall be permitted to run at large or to come in contact with any animal not so affected or exposed.

2. Any Inspector may declare to be an infected place within the meaning of the "Animal Contagious Diseases Act," any place or premises where the infection of Mange is known or suspected to exist.

3. No animal nor any portion or product thereof shall be removed out of any place so declared to be an infected place without a license signed by an Inspector.

4. Inspectors are hereby authorized to inspect any animals affected with Mange, or suspected of being so affected, or which have been in contact with animals so affected, or suspected of being so affected, or which have been in any way whatever exposed to the infection of Mange, and may order any such animals to be collected, detained, isolated, dipped, or otherwise dealt with, as may to them appear advisable.

5. The expenses of, and incidental to the collection, isolation, seizure, or otherwise dealing with animals for the purposes of these Regulations shall be borne by the

owners of the animals and no indemnity shall be allowed to the owner in case of damage arising out of or resulting from such actions except as hereinafter provided.

6. Where a Veterinary Inspector so orders, no animal or animals shall be allowed access to any field, common, yard, stable, or other place or premises where Mange exists or has existed.

7. Premises on which animals affected with Mange have been kept are to be dealt with at the expense of the owner, in a manner satisactory to the Veterinary Inspector.

8. Animals affected with Mange or which have been in contact with, or in close proximity to animals affected with Mange, may, on an order signed by a Veterinary Inspector, duly appointed under the "Animal Contagious Diseases Act," be forthwith slaughtered and the carcasses disposed of as in such order prescribed, compensation to be paid to the owners of such animals if and when the Act so provides, but no Inspector shall order the slaughter of such animals without having first received, from the Minister, special authority to do so.

9. Before an order is made for the payment of compensation in any of the cases aforesaid, there must be produced to the Minister of Agriculture a satisfactory report, order for slaughter, certificate of valuation and slaughter, and certificate of cleansing and disinfection, all signed by an Inspector.

10. Any Inspector may declare any steamship, steam, or other vessel, railway car or other vehicle, on or in which animals affected with or suspected of being affected with Mange are or have been placed for the purpose of transit, to be infected, and may also declare such vessel, car or other vehicle, to be no longer affected after it has been thoroughly cleansed and disinfected in accordance with his instructions.

11. Every yard, stable, cowshed, outhouse, or other place or premises, and every wagon, cart, carriage, car, or other vehicle, and every utensil or other thing infected or suspected of being infected with Mange shall be thoroughly cleansed and disinfected by, and at the expense of the owner or occupier in a manner satisfactory to an Inspector.

APPENDIX No. 23.

REGULATIONS RELATING TO MALADIE DU COIT.

By Order in Council dated 22nd July, 1911, in virtue of "The Animal Contagious Diseases Act, R.S.C., 1906."

1. No animal which is affected, or suspected of being affected with Maladie du Coit shall be permitted to run at large or to come in contact with any animal which is not so affected, and no such animal shall, in any case, be used for breeding purposes.

2. Any Inspector may declare to be an infected place within the meaning of "The Animal Contagious Diseases Act," any common, field, stable or other place or premises where animals are found which are infected or suspected of being affected with Maladie du Coit.

3. No horse, ass or mule shall be removed out of any place so declared to be an infected place without a license signed by an Inspector.

4. The Veterinary Director General may, from time to time, order the slaughter castration, or other disposition of animals affected with Maladie du Coit.

5. Inspectors are hereby authorized to inspect any animals affected with Maladie du Coit, or suspected of being so affected, or which have been in contact with animals

so affected, or suspected of being so affected, or which have been in any way whatsoever exposed to the infection of Maladie du Coit, and may order any such animals to be collected, detained, isolated, castrated, or otherwise dealt with as may to them appear advisable.

6. The expenses of and incidental to the collection of, isolation, seizure, castration, or otherwise dealing with animals for the purposes of these Regulations shall be borne by the owners of the animals, and no indemnity shall be allowed to the owner in case of damage arising out of or resulting from such actions, except as hereinafter provided.

No entire horse, ass or mule nor any ridgling more than one year old shall be permitted to run at large on unfenced lands in the Province of Alberta or in that portion of the Province of Saskatchewan lying west of the third principal meridian.

8. Any entire horse, ass or mule or any ridgling more than one year old found running at large within the area defined above may be seized and held, on the order of any duly authorized Veterinary Inspector of the Department of Agriculture, who shall forthwith whenever possible, notify the owner of the said animal of such seizure, and the said animal, if not claimed within thirty days of such seizure, may be castrated, and no indemnity shall be allowed to the owner in case of damage arising out of or resulting from said castration, seizure or detention.

9. Animals affected with Maladie du Coit may, on an order signed by a duly appointed Veterinary Inspector, acting under special instructions from the Veterinary Director General, be forthwith slaughtered, and the carcasses disposed of as in such order provided, and compensation may be paid to the owners of such animals if and when the Act so provides.

10. Before an order is made for the payment of compensation in any of the cases aforesaid, there must be produced to the Minister of Agriculture a satisfactory report, order for slaughter, certificate of valuation and slaughter, and certificate of cleansing and disinfection, all signed by an Inspector.

APPENDIX No. 24.

SPECIAL ORDER REGARDING THE MOVEMENT OF HORSES IN ALBERTA AND SASKATCHEWAN.

By Order in Council of 19th August, 1911.

Whereas certain contagious diseases exist among horses in those portions of the provinces of Saskatchewan and Alberta which may be described as bounded by the International Boundary, the Rocky Mountains and a line drawn as follows:—

A line from the Rocky Mountains along the northern boundary of the Stoney Indian Reserve to the line between ranges 5 and 6 west of the 5th meridian, thence north along that line to the line between townships 40 and 41, thence east along that line to the 4th principal meridian, thence south along the 4th principal meridian to the Red Deer River, thence along the Red Deer and Saskatchewan rivers to the line between ranges 7 and 8 west of the 3rd meridian, thence south along that line to the International boundary.

And whereas it is advisable and in the public interest, with a view to eradicating the disease, that regulations be established for this purpose.

Therefore His Excellency in Council is pleased to make and establish the following regulations and the same are hereby made and established accordingly.

Regulations.

1. No horse, except as hereinafter provided, shall be removed or allowed to move out of the said tract unless and until it has been examined by a Veterinary Inspector of the Department of Agriculture and certified to be free from contagious disease.

2. All horses which are intended to be removed or to be allowed to move out of the hereinbefore described tract, except as hereinafter provided, shall be inspected, and if found diseased, or to have been in contact with diseased horses, shall be dealt with in accordance with the provisions of the Animal Contagious Diseases Act and of the regulations made thereunder.

3. No railway company shall accept or load for shipment from or to any point, either within or without the said tract, any horses which have originated therein unless such horses are accompanied by the certificate of an Inspector of the Department of Agriculture, as above provided.

4. All cars and other vehicles used for the carriage of horses originating within the said tract shall be cleansed and disinfected to the satisfaction of an Inspector as soon as possible after being unloaded and before being used for any other shipment.

5. All way bills and bills of lading accompanying shipments of horses originating within the said tract shall have plainly written or stamped across the face thereof, a notification that the said cars are to be cleansed and disinfected immediately after being unloaded.

6. The transit of horses through the said tract is hereby permitted subject to the following regulations:—

(*a*) Horses for transit by rail through the said tract from one part of Canada to another, shall, at points where unloading is necessary, be placed in yards reserved for their exclusive use, and *shall not be permitted to come in contact with horses which have originated within the said tract.*

(*b*) Horses imported from the United States into the said tract destined for points in Canada outside thereof, may, upon compliance with the quarantine regulations and with the provisions of the next preceding section hereof, be permitted to pass, without unnecessary delay, through the said tract direct to their destination, without further restrictions.

7. Any infraction of these provisions shall be deemed an infraction of the Animal Contagious Diseases Act and dealt with accordingly.

8. The Minister is hereby empowered to make such alterations in the boundaries of the quarantined area defined by this Order as may from time to time seem to him necessary or advisable.

APPENDIX No. 25.

THE INTERNATIONAL AGRICULTURAL CONGRESS AT MADRID.

OTTAWA, March 31, 1912.

SIR,—As delegate for Canada, I have the honour to present a report on the ninth International Agricultural Congress, which was held at Madrid from May 1, to 8, 1911, under the distinguished patronage of His Majesty the King of Spain.

These Congresses are attended by official representatives of many of the principal countries of the world, and afford valuable opportunities for the discussion of the economic and scientific questions relating to all branches of agriculture, and for the interchange of views based on experience as to the best means of promoting the de-

velopment of the agricultural industry. Great Britain was represented on this occasion by Sir Thos. Elliott. K.C.B., Secretary to the Board of Agriculture and Fisheries, and by Mr. T. H. Middleton, Chief of the Agricultural Intelligence Division of the Board of Agriculture and Fisheries.

The Congress was attended, apart from the official delegates, by a very large body of farmers and others to the number of upwards of a thousand, of whom Spaniards formed probably two-thirds. The enthusiasm with which the Congress was received, and the interest which it created in Spain, were largely due to the labours of the Comte de Montornes, who, as President of the Committee of Organization and Rapporteur General to the Congress, was untiring in his efforts to make it a success. It was to his initiative that the Congress owed not only the support of the Spanish government, but also the attendance of the agricultural societies of Spain, which contributed so greatly to the success of the meeting. Agriculturists, not only in Spain, but everywhere else, are greatly indebted to him for the ability and public spirit which he brought to bear on the discharge of the duties which he had undertaken on their behalf.

The Congress was opened on May 1 by His Excellency Don Rafael Gasset, the Minister in charge of the Spanish Department of Agriculture, a former President of the Council and Minister of Agriculture in France. M. Meline, after referring to the progress of agriculture during the past quarter of a century, dealt with the problem of rural depopulation, with which his name is chiefly associated, and also with the shortage of agricultural labour which is noticeable in many parts of continental Europe.

On May 7 the Congress was brought to a close by a meeting at which His Majesty the King of Spain was present. After the presentation of reports on the resolutions of the sections, and other business, His Majesty was pleased to express, in moving terms, his recognition of the labours of the Congress.

The work of the Congress was distributed among eight sections, dealing with the following groups of subjects: (1) economics, (2) statistics, (3) surveys, (4) forestry, (5) viticulture, (6) fruit culture, (7) breeding of live stock, (8) manures. Material for the work of the sections was provided by preliminary papers, the conclusions arrived at in which were discussed, and formed a basis for the resolutions that were to be the final outcome of the Congress.

Of these resolutions some consist of recommendations, for submission to the governments concerned, with regard to possible reforms; others are suggestions to land owners with respect to improvements that can be introduced in the cultivation of the soil. The permanent commission of the Congress is charged with the duty of transmitting to the International Institute of Agriculture, at Rome, the resolutions having an international object, with the furtherance of which it is concerned.

Economics.—The first section was devoted to rural economy. This included a number of subjects of considerable importance, and the programme was particularly full, more than twenty-five papers being submitted for consideration.

The first question dealt with the means of keeping agriculturists on the land, including in the term landowners, farmers and labourers. The problem has many aspects, and it arises in different forms in different countries. Among the six papers on this question that were presented, one of the most important was that of the Comte de Montornes, on a plan for the management of a large estate, which has been put into operation in the Province of Valencia. M. H. Hitier, contributed an interesting paper, which was much appreciated, on the provision of suitable housing accommodation as a means of keeping agricultural labourers on the soil. Finally, the section recommended a series of legislative measures designed to facilitate the creation of small holdings, to foster co-operation and all movements directed towards the promotion of the general welfare. It insisted, also, on the advantage that would

result from a reduction in the excessive subdivision of holdings. It also pointed out the advantage to municipalities, in conjunction with large landowners, of forming 'back to the land' committees, for the purpose of facilitating, where desirable, the return of agricultural families, to the soil.

The second subject related to agricultural education, and papers were contributed by M. H. Grosjean, on the agricultural instruction to be given to the rural classes in France; by M. Westermann, on agricultural education in Denmark; and by M. Paul de Vuyst, on associations for women agriculturists in Belgium.

Co-operation and agricultural credit formed the third subject dealt with. The conclusions arrived at were mainly of a general character. The section insisted strongly on the necessity for freedom in the creation and development of agricultural co-operative societies, especially those for the purpose of supply, production and sale. Suggestions were made in regard to the organization of credit societies that will be useful in countries where such societies are not numerous.

Questions relating to water supply are of the first importance in Spain, and numerous papers on the subject were contributed. Those dealt especially with state intervention in irrigation. In that country the demand is unanimous that the state should supply at the proper times the water that is indispensable for agricultural operation. To this end the establishment of a hydrological department is advocated, for the purpose of surveying and improving the water supply. The principle of subventions in aid of the construction of irrigation canals was approved on the ground of the eminently productive character of such undertakings, and assistance was asked, not only for new undertakings, but also for the extension of those already existing. In addition to the utilization of surface streams, the investigation of underground sources of water was included.

The section also considered the question of weirs and the use of water power for electric power stations, undertakings that have a direct effect on the water supply for agricultural purposes. On this subject M. Leon Dabat presented a paper on the distribution of electric power, the conclusions of which were adopted by the section. They may be summarized as follows: In granting concessions for the use of water for the purpose of electric power works, the concessionaires should only be allowed to charge a certain price for the sale of power for raising water for the purposes of general utility, particularly for irrigation, sanitary purposes, drinking water, &c.

Statistics.—The second section, to which the representative for Canada was particularly assigned, dealt with the collection and use of statistics. The discussion resulted in a series of resolutions in the following terms:—

1. That an official statistical department should be organized in every country for the purpose of providing farmers with all the information they require to enable them to arrange their production, and that sufficient financial resources should be placed at the disposal of this department. It should be arranged that the statistics should be published as often and as rapidly as possible.

2. That legislative or administrative means should be taken in each country to verify and publish as frequently as possible, not only the price actually current for the products of agriculture and agricultural industries, but also the quantities offered and sold at each rate quoted in the official lists.

3. That the International Institute of Agriculture at Rome should be recommended to continue the plan which it has adopted of putting at the disposal of the world the agricultural material transmitted to it by the various governments, and to develop, on as etxensive a scale as possible, the series of statistical inquiries at present in course of publication.

4. That in order to facilitate the comparative study of the statistics of different countries, relating to the trade in the products of agriculture and agricultural industries, standards of quality should be established in each country, which would serve

as a basis for comparison, The Congress suggested that the International Agricultural Institute at Rome should examine this question, with the object of defining useful types.

5. That for the most important crops, cereals, for example, the reports published should begin at the earliest stage of growth, and should be published every month, up to the time immediately preceding the harvest.

Surveys.—The third section, dealing with surveys, adopted only a series of general recommendations, dealing with the methods of official surveys, their advantage and disadvantages, &c.

Forestry.—Numerous papers were presented to the forestry section, which was one of the most active sections of the Congress. The nature of the discussion is shown by the following general conclusions which were adopted:

The progress of agriculture and stock-breeding requires, as an indispensable preliminary measure, the reafforesting, and subsequent conservation and management, of all the mountainous districts in the forest zone.

At present the mountainous districts fail to exercise their normal and natural action on the climate, the water system, and the economy of the country.

The forestry administration should divide the mountainous districts forming the forest zone into two main groups, viz.: protective and productive areas. The freehold of all land included in the area of protective mountainous districts should be acquired by the state, and immediate steps taken for a soil survey, and the reafforestation and management of such land.

The state should exercise technical and administrative control over all mountainous areas that are the property of the villages or public bodies. They should be preserved, as being productive, though not protective, by the fact of being included within the forest zone. Over the remaining mountainous districts included in the forest zone and held as private property, the state should only exercise a technical inspection, sufficient to ensure their proper maintenance and improvement.

The state should proceed to the delimination of the forest zone, and to the classification of the mountainous regions included in it into protective and productive areas, and declare them of public utility.

It was suggested that one of the most important aims of the Congress should be the conclusion of international conventions as a means of arriving at the formation of an international code in the reafforestation of mountains. A union should be established of the states bordering on the Mediterranean for the solution of the forestry problems of the region.

The various states, by example and precept, by moral and material support, and by fiscal immunities and legislative provisions designed to attract private or collective capital, should promote the maintenance and improvement of existing forests, the management, as regards forestry and grazing, of mountains, and the reafforestation of waste lands.

The state should, by various means, increase the wooded area, and maintain and improve the Alpine pastures. To this end it should strive to increase the public forest area, and to stimulate the formation of associations for the purpose, by attracting capital towards reafforestation, at the same time preventing undue exploitation.

It will be necessary, in connection with rivers having an international character, that the work should be carried out on a method drawn up by agreement among the countries interested, each engaging to follow the plan as far as its financial resources and circumstances will allow.

Steps should be taken to popularize the view that agriculture will derive great benefit by the partial substitution of forestry for cultivation where the conditions are unfavourable for the latter, by increasing, in dry regions, the number of wooded pas-

tures, and by dividing arable fields by lines of trees at right angles to the direction of the prevailing wind.

Arbour days should be made general, and should be given an educational character. Societies for the promotion of tree-planting and forestry should be encouraged.

Viticulture and Fruit Growing.—The fifth section of the Congress was devoted to viticulture and wine-making, and, in view of its importance in the southern countries of Europe, the subject naturally attracted much attention. The sixth section was devoted to fruit trees, and also chiefly concerned itself with fruits grown in southern Europe, such as the orange, lemon, and olive.

Insects and fungi attacking these trees were the subject of two reports, and, taking as a basis the results which have been attained in the U.S.A. by the introduction of certain useful insects, parasitic or harmful insects, the Congress expressed the desire that entomologists in the different countries should request their respective governments to undertake the study and classification of these useful insects and to facilitate the exchange of colonies of these insects with countries where insects which they destroy are prevalent.

Live Stock.—In the seventh section, the feeding of cattle was the most important consideration. The Congress expressed the desire that the procedure with regard to the analysis of feeding stuffs for animals in different countries should be made uniform, and that tables of feeding values for different districts be drawn up, showing the great differences between the nutritive value of products according to their place of origin. Such tables should be brought together in pamphlet form, for distribution to breeders, and should include typical model rations for different animals by districts.

Another resolution asked for uniformity in sanitary regulations relating to animals, and the spread among agriculturists of a practical knowledge of the hygiene of animals.

The section also dealt with methods of treatment of grassland, and asked for the creation of organizations whose special duty it would be to act as intermediaries for the purchase of seeds, of which the quality should be guaranteed.

Manures.—The object of the eighth section was to collect information on the application of new manures produced by the absorption of nitrogen from the air.

As a result of the papers presented to the Congress, the conclusion was arrived at that nitrate of lime and calcium cyanide are nitrogenous manures well deserving the attention of the whole agricultural world, though more experiments with these manures must be undertaken to ascertain exactly how they should be used.

The other conclusions relate to comparisons between the action of these two manures. The section concluded that nitrate of lime acts similarly to nitrate of soda, while calcium cyanide appears to behave like sulphur of ammonia.

I have the honour to be, sir,
Your obedient servant,

T. K. DOHERTY,
Delegate for Canada.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 26.

INTERNATIONAL INSTITUTE OF AGRICULTURE.

ROME, May 21, 1911.

SIR,—The third General Assembly of the International Institute of Agriculture opened in Rome on the 14th May. The ninety-three delegates representing the 48 nations who compose the Institute, at their first meeting elected Mr. Raineri, former Minister of Agriculture of Italy, as president, and the Hon. David Foster, first delegate of the United States, and His Excellency Baron de Bildt, Swedish Ambassador to the King of Italy and permanent delegate from Sweden to the Institute, as First and Second Vice-Presidents.

The King of Italy, founder of the Institute, and whose interest in its work and success has always been very great, accompanied by the Queen, honoured the afternoon reception by their presence, and I had the honour of introducing to Their Majesties Mr. T. K. Doherty, official correspondent of Canada to the Institute and my fellow delegate to the General Assembly.

Many changes have taken place in the Institute since the last General Assembly in 1909. Count Faina, President of the Institute, since its foundation in 1905, resigned in the beginning of 1910, and with him most of the permanent staff retired.

Marquis Cappetli, the new President, in his opening address, feelingly alluded to Count Faina's retirement and the loss the Institute has suffered, for it was his devotion, hard and continuous work, which has brought it to its present position, and as he counted none but friends among the delegates, his absence from our meeting caused many regrets, so did the disappearance of the permanent staff, with whom Canada counted none but friends.

The finances of the Institute are in a very prosperous condition and quite a handsome surplus was carried forward at the end of the fiscal year, 1910. As the next General Assembly will not take place till the spring of 1913, a total of two millions two hundred and ninety-eight thousand francs (2,298,000) was voted for the two years 1911 and 1912.

The monthly crop reports of the Institute, owing to the official information on which they are based, are becoming more and more important, and at no distant date will be quite a factor in the commercial world, as they become better known. The other publications, viz.: 'Bulletin d'Information Agricole' and the one 'Sur les Societes d'Economics Sociales' are both so very interesting as to be indispensable, when one considers that one contains in a condensed form the information culled from no less than 1,500 agricultural magazines and reviews.,

The General Assembly which closed its labours on the 20th of May, was most interesting as the questions on the programme of the meeting, and sent to your Department last February, show. Each and every question was thoroughly discussed and the decisions taken most judicious and wise, particularly the ones dealing with the protection of birds useful to agriculture, and the system of dry farming and insurance against hail. The question of a uniform and improved system of collecting and sending the monthly statistics to the Institute was again brought forward and forms quite an important item in the wishes expressed by the General Assembly, so was also the question of paying in the first four months of the year the annual contribution of the different governments to the Institute.

Mr. Wyndham, of the British Embassy in Rome, who so capably represented Canada at the sittings of the Permanent Committee, having been appointed His

Majesty's Minister to Colombia, Mr. Dering, his successor in Rome, has also kindly consented to represent Canada on the Permanent Committee, and the thanks of the Canadian Government are due to both these gentlemen for looking after our interests in the Institute so generously and so well.

The whole respectfully submitted,

ARTHUR BOYER.

The Honourable Minister of Agriculture,
Ottawa.

APPENDIX No. 27.

INTERNATIONAL UNION FOR THE PROTECTION OF INDUSTRIAL PROPERTY.

(TRANSLATION.)

The delegation from Canada believes it to be its duty to thank the government of the United States for having invited its country to be represented at the International Conference for the Protection of Industrial Property at Washington and at the same time the delegation has pleasure in thanking the Conference for having accorded it the right to take part in the deliberations, although Canada has not been able to accede to the convention.

The presence of delegates from Canada may be construed as an intimation on the part of the Government of Canada of its sympathy with the aims and objects of the Conference which must have the effect of increasing the feelings of international amity and of advancing the progress of civilization through the extension of friendly competition in the arts of peace.

The Canadian delegation regrets to communicate to the Conference that the particular conditions in which Canada finds itself prevent its government from accepting certain of the articles of the proposed convention.

Public opinion in Canada would, in the view of the Government of Canada, be opposed to any relaxation of the provision of the Canadian law avoiding a patent for importation of the patented article after the expiration of twelve months from the granting of the patent, or an authorized extension of such period nor would it be favourable to the substitution of the provision of the article which it is proposed to add to the convention requiring manufacture in only one country of the Union for its present law requiring manufacture within the Dominion. If, however, the deliberations of the Conference should result in the according, to countries desiring to enter the Union, the privilege of making a reservation with regard to certain articles, Canada would then be in a position to ask that its accession to the convention be sginified, the remaining points in regard to which the law of Canada is inconsistent with the articles of the convention, as submitted, being immaterial.

The delegation of Canada has great diffidence in advancing the foregoing proposition and is induced to adopt this course of action owing to the fact that the law of Canada with the exception above indicated, to-day accords to all nations all the rights and privileges secured by the convention, exacting nothing in return. Furthermore, the delegation bases itself on the precedent established by the revised Convention to Berne, for the protection of literary and artistic works, under the provisions of which, as understood by the delegation, the adhering countries have the privileges of making reservations, with regard to the stipulations which they cannot apply.

In any event the delegates of Canada will esteem it a privilege to be permitted to share in the deliberations of the Conference in order to obtain information which

will be valuable to the Government of Canada on the subject of the deliberations of the Conference.

In conclusion the delegation of Canada places itself at the disposal of the Conference with a view to communicating such information regarding the law and practice, with respect to industrial property, as may be of service to the members of the Conference.

APPENDIX No 28.

MEMORANDUM.

Of Proceedings of the Thirteenth International Congress Against Alcohol held at The Hague, Holland, September 11th to 16th, 1911.

The International Congress on Alcoholism, which opened at Scheveningen in The Hague, Holland, on Monday, September 11, 1911, was the thirteenth of a series which began in the city of Antwerp, Belgium, in the year 1885. Preparations for this meeting were made by a permanent committee appointed at the last preceding congress in London, in 1909, of which His Royal Highness, Field Marshal, the Duke of Connaught and Strathern, was honorary president, and the Right Honourable Lord Weardale was acting president.

This Thirteenth Congress was convened under the auspices of Her Gracious Majesty Queen Wilhelmina of Holland, and the Dutch Government. Its sessions were held in the Kurhaus at Scheveningen, and it was largely attended, there being present official delegates appointed by the governments of different nations, along with more than one thousand delegates chosen by various religious, temperance, and other philanthropic organizations which were invited to send representatives. Among the latter were many persons of scientific and literary eminence. A large number were Catholic and Protestant clergymen. The Holy See was represented by Mgr. A. J. Callier, the Bishop of Harlem. Official delegates were present from the following countries:

Great Britain, and the overseas British Dominions of Canada, Australia, South Australia, and South Africa; the United States of America; Austria, Belgium, Denmark, France, Germany, Greece, Hungary, The Netherlands, Norway, Portugal, Roumania, Servia, Sweden, Switzerland, Uruguay.

The official delegates representing Great Britain were John Pedder, principal clerk in the Home Office, and Dr. R. B. Branthwaite, Inspector under the Inebriates Act. The official delegates representing the Dominion of Canada were Mr. Justice Eugene Lafontaine, of Montreal, Quebec, and Controller Francis S. Spence, of Toronto, Ontario.

OPENING SESSION.

The Congress was formally opened on Monday evening by divine service in the Evangelical New Church, and the Roman Catholic Church of St. Antonius Abbott. Among the participants in the leadership of the services were the Rev. J. R. Slotemaker De Bruine, D.D., from Utrecht; the Very Rev. the Hon. J. W. Leigh, D.D., Dean of Hereford; the Rev. R. Burckhardt, D.D., from Berlin; the Rev. Victor Brough, from Geneva.

These services were followed by an official reception tendered by the Burgomaster and Aldermen of The Hague to the delegates.

SECOND DAY.

The formal proceedings of the Congress proper began on the morning of Tuesday, September 12, with addresses by the Hon. J. W. Leigh, D.D., President of the Permanent Committee; by His Excellency Dr. Heemskerk, President of the Council of the Dutch Government, by a number of government delegates and by other representatives of different organizations in various countries. The officers of the Congress were then elected, His Excellency the Honourable A. S. Talma, Minister of Agriculture for the Netherlands, being chosen as president.

On Tuesday afternoon the question of the treatment of habitual inebriates was taken up, the first speaker being Dr. Ph. Stein of Budapest. He spoke upon the question of the proper psychological treatment of inebriates in asylums or special institutions. The treatment of similar cases in which the victim is not under restraint, was discussed by Miss Wilhelmina Lohmann, of Bielefeld, and Jules Joseph, of Geneva. K. H. Bouman, M.D., of Amsterdam, then presented an interesting statement concerning what he called a Consultation Office for Inebriates. Landsrat Schellman, M.D., of Dusseldorf, Sanitatstrat Seiffert, M.D., of Bouthen, and Dr. Feldmann of Eckardtscheim, gave their ideas of the methods that ought to govern homes for inebriates.

THIRD DAY.

The third day's work was of special interest. It began with a very instructive review of principles and progress on legislative lines by Dr. R. Hercod, of Lausanne. This was followed by papers read by Dr. Von Straussand-Torney, of Berlin, on German license laws, and by Dr. Scharffenberg, of Christiania, and Dr. Matti Helenius, of Helsingfors, on local option. Then came the discussion in which the expressions of endorsement of the prohibition plan were numerous and strong.

Different speakers told of progress made on legislative lines in different countries. Rev. Dr. Dinwoodie's record of legislation for the promotion of temperance in the United States was very cordially received, and a statement of conditions in the Dominion of Canada, made by Controller Spence, was warmly applauded. Other speakers at this session were Arthur Sherwell, M.P., of England, Dr. A. Akhers, of Germany and Rev. Dr. J. Patterson, of Belfast.

In the afternoon the theme was 'Alcohol and Degeneration,' the leading speakers being Prof. Forel, M.D., of Yvorne, Switzerland. Others who read papers were Dr. Wlaska, of Vienna, and Theo. B. Hyslop, of London. The same subject was discussed at the meetings of the Confederation of Abstinent Physicians, outside the regular Congress sessions, in valuable papers by Prof. Taav Laitinen, of Helsingfors; Dr. A. Holitscher of Pirkenhammer, and Dr. B. H. Vos, of Hellendoorn.

In the evening there was a public meeting addressed by Dr. W. P. Ruijsch, chairman of the local reception committee; Mr. Louis Mulaert, of Bruges; Prof. J. Van Rus, of Amsterdam; and Rev. Mr. Patterson, of Belfast.

FOURTH DAY.

'How to Obtain the Sympathy of Governments and Parliaments' was the topic discussed by the fourth day's sessions. The 'Congressists,' as they were officially called, who made the chief addresses were: Dr. Moller of Berlin, Dr. Henry Hayem of Paris, Dr. H. Schmidt, of the same place, and Leif Jones, M.P., President of the British United Kingdom Alliance. The first address discussed the question, generally; the second, economically; the third, judicially; and the fourth, politically.

In the discussion which followed these addresses, the principal speakers were Mr. E. Howard, of Letchworth, Mr. Arthur Sherwell, M.P., of London, and Controller F. S. Spence, of Toronto.

FIFTH DAY.

On Friday, the first question taken up was that of the liquor traffic in the colonial possessions of European nations. Rev. John Rauws, of Rotterdam, secretary of the Netherlands Missionary Association ,and Dr. A. H. J. G. Walbeehm, of The Hague, dealt with the subject from the Dutch viewpoint. Baron Joseph Du Teil, of Paris, general secretary of the Colonial Committee of the French National League against Alcoholism, spoke on the subject in general terms. Dr. Hans Paasche, of Berlin, did the same. All the addresses were pointed and interesting.

The next matter dealt with by the Congress was the selection of a place for another similar meeting to be held in 1913. Milan, in Italy, was chosen, and a permanent committee was appointed to make the necessary preliminary arrangements.

In the afternoon, the subject for discussion was 'Organization for Work to Remedy the Evils of Intemperance.' Prepared addresses were delivered by Mr. F. Riemain of Paris, general secretary of the French National League against Alcoholism; Dr. J. Bergman, of Stockholm; Dr. Alfred Smith, of Brennstadt, on general lines, and upon religious temperance work by Prof. L. Gonser, of Berlin; Ecclesiastical Josephson, of Halle and Salle, and Rev. Father Syring, of Heldhausen.

The questions raised in these speeches were further discussed by different delegates, including Mr. Justice E. Lafontaine, of Canada.

'Indirect Work for the Promotion of Temperance,' was the next subject taken up. Dr. G. Volk, of Frankfort, spoke of popular education and information concerning the nature and effects of alcohol. J. W. H. Theobald, of London, described Club and Settlement work. H. Van Der Mandere, of The Hague, told of plans of keeping tempted men employed at home in their leisure hours, and Mr. E. Howard, of Letchworth, spoke again on 'Garden Cities and Town-planning Associations.'

SIXTH DAY.

The forenoon of the closing day of the Congress was occupied with the consideration of two subjects: (1) the Judicial Treatment of Habitual Inebriates; (2) Indirect Work against Alcoholism.

Four papers were submitted, dealing with the question of the most useful method of treating confirmed inebriates. All were by legal men. Compulsory medical treatment, conditional court sentences, and indeterminate sentences were the systems advocated. The speakers were: Dr. J. Van Deventer, of Amsterdam, Dr. R. B. Ledeboer, and Dr. H. C. J. Groot, of the Hague, and Judge W. J. Pollard, of St. Louis, Mo., U.S.A.

In the afternoon a complimentary farewell luncheon was given to the official delegates in attendance, at which interesting addresses were delivered by Dutch Cabinet Ministers and some other national representativs.

SECONDARY MEETINGS.

Delegates attending the conference, representing different organizations, took advantage of their coming together for the purpose of holding special meetings, while the Congress was not in session. Many of these meetings were largely attended, and addresses of very much interest were delivered at some of them. Among the organizations which conducted these secondary meetings may be mentioned:—

The Dutch Temperance Union.
The International Social Abstainers.
The International Railway Total Abstinence Society.
The International Temperance Bureau.
International Priests Meeting.

International Union of Abstaining Physicians.
The Protestant Temperance Unions.
The International Union Against Intemperance.
The Native Races and the Liquor Traffic United Committee.
Abstaining Teachers.
The World's Prohibition Confederation.
The I.O.G.T. Supreme Lodge.
Abstaining Students.
International Catholic Union Against Alcoholism.
The International Moral and Social Commission.

In connection with the Congress, there was also held an exhibition, in which a number of temperance workers cordially co-operated. Its location was the Kunstkring, Heerengracht, at The Hague. Here were shown samples of temperance literature published in many languages; official posters, prepared by government authoritis; appliances for the teaching of temperance lessons to young people; many diagrams giving valuable statistics and information concerning the extent of the liquor traffic, and the progress of the temperance cause. Adjoining the exhibition was a lecture room, in which scientific addresses were delivered during the Congress, illustrated by stereopticon views. This exhibition was exceedingly attractive and interesting.

Subjoined is an appendix, giving a summary of some of the most important papers read and addresses delivered at the Congress.

1. Home Treatment of Inebriates.

(By Mr. Jules Joseph, Geneva.)

There is only one means by which an alcoholic patient may be cured. Total abstinence. How can this be ensured without confining the patient?

By visiting the patient at home.

The immediate purpose of such visits. To gain the confidence of the patient. To stimulate his own desire for a cure. To obtain from him a pledge of abstinence.

The subsequent purpose of the visits. To show to the patient an interest in all that concerns him. To help him to keep his pledge by fortifying his will, by making his conscience clear, and his heart more sensitive. (A capital point is to make use of his religious beliefs.)

How may one secure all this? By making oneself well acquainted with the psychology of alcoholism. By making one's self well acquainted with all the personal circumstances of the patient. By knowing how to give good advice and useful directions to the patient's family.

Dangers to avoid: Any marked excess of confidence, or on the other hand, coldness. Any excessive indulgence or rigour towards other faults or habits of the patient. Being indifferent to, or aiding too much the material welfare of the patient.

When to pay such visits. Look carefully for the days and moments the most suitable, the opportunities the most promising. Persevere without being importunate.

By whom should such visits be made. By devoted friends of the patients. By those who have themselves been cured of alcoholism. By salaried persons.

Experience has shown that, despite all their devotion and ability, individual visitors are not able to satisfy all the requirements for the influencing of alcoholics. In every case where possible, Patronage Committees should be formed, to use moral authority over the patient, and influence with the civil authorities. They may help as intermediaries with the trades unions and the employers.

Finally the material or moral, legal or administrative condition of the patient may be such that recourse may be had to a Consultation Bureau.

2. Care for the Families of Inebriates.

(By Miss Wilhelmina Lohmann, of Bielefeld.)

As the mania for alcohol completely wrecks the family life and severely injures the education of the children, organized care for the family of the drinker is absolutely necessary.

This should not consist of charity and in granting support, as this only makes the evil greater, but in a work of redemption which embraces the whole family life. This means bringing the completely disordered circumstances into the right way again. The wife must be shown that abstinence is necessary for good housekeeping and the education of the child. She must learn how to gain influence over her husband so as to cause his becoming a member of a total abstinence society, which she, with her children, shall first join. Such work is best performed by the visits of socially inclined women, as these are naturally the most fitted to do it. These visits must take place regularly, and once a week at least. Such assistants are urged to study the alcohol question and to become themselves members of a total abstinence society, if they do not belong to such already. This cure of inebriates, conducted by women, requires to be directed by a cultivated lady who is a total abstainer and gifted with a knowledge of social matters. She may be appointed in large cities as an official of the public welfare, which should be her chief work.

3. Consultation Offices for Alcoholism.

(By Dr. H. K. Bouman, of Amsterdam.)

Consultation offices for alcoholism can be an important factor in combating drunkenness in thickly populated centres.

By their method of work these offices start with the principle of leaving the drunkards as much as possible to their own social surroundings and the conduct of their businesses, only excepting those cases where repeated attempts in this direction have failed, or psychoses, diseases, injuries, &c., make necessary a temporary stay in an inebriate home or hospital.

Therefore they ought to be continually in touch with existing societies for the combating of intemperance, medical institutions, private doctors, courts of law and police, poor law authorities, charitable institutions of all kinds, &c., and they should work with these different bodies, co-operating where it is possible.

A direct control service springing from the consultation offices themselves and embracing those inebriates entrusted to their care, is moreover necessary.

The treatment given during visiting hours at the offices, should be under medical supervision and in general should have an educational character and may, in special cases, if necessary, receive great help from the officers of the law, but they ought to accommodate themselves to national character and may be modified according to the peculiar circumstances of the country.

Besides the giving of direct help in this way to those inebriates who come for treatment, or to their families, the chief work of the consultation offices ought to be the gathering of statistics concerning problems in the region of combating alcohol, so far as the material acquired can give such information, for example, regarding heredity, different forms of drink mania, influence of social surroundings, anthropological differences in the sphere of inebriety.

4. Inebriate Homes.

(By Dr. Schellman, of Dusseldorf; Dr. Sieffert, Beuthen; Dr. Feldmann, Eckardtsheim.)

1. Inebriate homes are necessary in order to help the drinkers and their families in the right way.

2. Before an inebriate home can be successfully worked, it is above all things necessary that it should have the fullest confidence of the people. For this reason it is necessary that the home should not be connected with the municipal authorities.

3. Before founding an inebriate home there ought to be obtained the concurrence of all temperance societies in the place chosen, who must have a place and vote on the committee of the home. There should also be represented on the committee the municipal council, and societies concerned with the welfare of the sick.

4. The home must have a doctor in regular attendance, although it is not necessary that the superintendent be a doctor.

5. The hours for visiting the home must be fixed by the staff. Frequent changes are not advisable, because the special treatment of the patients would thereby suffer.

6. From the beginning, the home should give no pecuniary help to the family of the drinker. It should help with advice, and show the way which appears necessary in the particular case.

7. Such a home would not be in competition with temperance societies, but only assist their work, procuring them new members at the same time.

8. After the termination of the cure, the home ought to keep the patient under supervision, to guard against relapse. To arrive at this result the home must have at its disposition numerous voluntary male and female assistants.

(By Dr. Sieffert, Beuthen.)

1. In inebriate homes, medical treatment has secured for itself an enduring place beside the older educational method.

2. A thorough medical examination is the foundation of every treatment in such an institution, on that the cure system must be built, and must be both educative and medical.

3. The work of the home is psychical (instruction), dietary (complete abstinence from alcohol), physical (work, gymnastics, baths, &c.,) and in respect to medicine.

4. The medical treatment takes place during visiting hours, by periodical general examination, advice and prescription, whenever possible by suitable intercourse with the sick

5. The educative activity must go completely hand in hand with the medical, when both are not already in the same hands.

(By Dr. Feldmann, of Eckardtsheim.)

The treatment of the drinker in inebriate homes does not only consist in curing the body of the intoxicated person, but also in a careful education of the victims of drink. In education we are concerned with two things. First to educate the patient to voluntary abstinence as a foundation of a useful life afterwards, and secondly, in the complete education of the individual and to cause him to utilize all the powers which he possesses which can be strengthend by an education on ethical principles.

The education in abstinence takes place by the personal work on the patient and by placing the patient in an atmosphere of total abstinence. The educational treatment of the individual takes place through individual means by accustoming him to his duties and by conquering his bodily and mental weakness.

5. Alcohol and the Deterioration of Germs.

(By Dr. A. Forel, of Yvorne.)

1. Alcohol poisons the cellular protoplasms. Proof: the degeneration of the vital organs of alcoholics.

2. The germinative cells are in all living beings the transmitters of heredity.

3. Heredity is the latent faculty, or energy, of the germinative cells by which are transmitted, at least in their principal traits the characteristics of kingdom class, order, genus, species and variety, from the progenitors to the descendants, as to form, as also to quality and functions.

4. According to Galton one understands by Eugenism the study of means (natural or artificial selection, or other methods) for arriving at a reproduction of individuals the best, the most capable, and the hardiest; and sterilization of the bad, the incapable, or the degenerate.

5. Under the term Blastophthory, I designate collectively those causes or actions which, without themselves constituting hereditary forces, derange or deteriorate the nature of the germs in such a fashion that the germ-products which are of good hereditary quality find themselves also disturbed and fettered in their ulterior development by the arrangement of their determinants. For example, once produced by an intoxication of the germinative cells, the Blastophthoric effects are able to fix themselves in the descendants, and thus become hereditary in their turn.

6. Alcoholic intoxication of the germinative cellules is the prototype of Blastophthory.

7. Blastophthory presents itself in two forms: Chronic Alcoholic B., and Acute Alc. B. These two forms together constitute one of the chief primitive sources of the said hereditary degeneration.

8. Proofs: (*a*) Statistics concerning the physical and mental degeneracy of descendants of alcoholics: Deume, Palmann, Jörger, Beck, &c.

(*b*) Statistics as to the ascendance of idiots, epileptics, lunatics, neurotics, tuberculosis patients, &c., as to the cause of dental decay, the failure of milk-giving in women, &c.: Jemmy Kohler, von Bunge, &c.

(*c*) Statistics of sick and life assurance societies as to mortality and disease (abstainers and non-abstainers). Swiss statistics as to the cause of mortality.

(*d*) Experiments made as to the progeny of alcoholised animals: Hodge, Combemelle, Cillarillier, Laitinen, &c.

(*e*) The various works of Laitinen as to the diminution of the Pemolytic faculty of the blood after small doses of alcohol: the numerous experiments made on animals and the researches on man.

(*f*) The experiments of Ziegler and Fuhner on the embryos of seals, by the addition to the sea-water of infinitesimal quantities of alcohol.

(*g*) The microscopical examination by Bertholet and Weichselbaum of degenerate vesticules of alcoholics.

(*h*) Acute Blostophthory. The remarks of De Bezzola concerning the epoch of the conception of 9,000 complete idiots, in the Swiss census of 1900.

9. The study of the relations of Blastophthory to hereditary and degeneracy is one of the most important problems of the future.

6. Some Economic Suggestions.

(By Dr. Henri Hayem.)

It is important by all possible means, (which means, moreover, may differ much according to the country), to make known to members of parliaments and governments the following economic truths:

1. The production of alcoholic beverages is far from being, for any country, wealth of the highest order. It demands considerable care, costly labour, it is subject to very numerous contingent conditions: unfavourable weather, cryptogramic diseases, insects, &c.
2. The economic force represented by the producers of alcoholic beverages finds itself, and will find itself more and more counterbalanced by an inverse force: that of the producers of non-alcoholic drinks (unfermented wine, beer and cider).
3. It is advantageous to the general wealth of the country to protect and encourage the cultivation of fresh fruits and the sale of preserved fruits.
4. The public treasury can find, through taxes on non-alcoholic beverages and on fresh and preserved fruits, an important compensation for the loss resulting from the prohibition of alcoholic beverages.
5. As a matter of fact the receipts obtained by the state through the taxes on alcoholic drinks are counterbalanced by the enormous expenses occasioned by the mischevious results of alcohol: police, lunatic asylums, prisons, the generally diminished value resulting from the insufficience of the vital forces of the people.
6. It is an advantage for those countries which desire to safeguard the public health to stipulate for, in their treaties of commerce, and to inscribe in their customs tariffs, prohibitive clauses against alcoholic drinks, and to offer as compensation to the countries producing such drinks particularly favourable conditions for the sale of their fresh fruits and conserves, and non-alcoholic drinks.

7. The Duty of the State.

(By H. Schmidt, of Paris.)

Has the state a right to intervene in the struggle against alcoholism? The material, mental and moral ravages caused by intemperance are so great as to menace even the existence of the nation. To suppress such an evil is not merely the power, but the duty of the state.

What ought to be the form and the limits of state intervention? Here is a question that invites wide discussion. Some will argue that the state ought only to render aid to wise moral propaganda initiated by private parties. Others believe that public interest demands whatever legislative action may be found necessary.

In brief, there is a strong, practical case for the defence of the community against the improvidence and weakness of individuals, which would justify the absolute interdiction of the consumption of alcoholic drinks, decided to be injurious in their effects.

But such prohibition is a course so extreme that it ought only to be employed where there exists a serious danger, caused by some specially dangerous drink. Methods less rigid may be no less efficacious. Often they are all that public opinion will tolerate.

The first duty is to help the present generation by measures which have to be very strong, and by rational, scientific education. The next is to ensure the protection of the young against the danger of acquiring the drink habit.

8. How to Influence Parliaments and Governments.

(By Mr. Leif Jones, M.P., of London.)

The temperance movement is not in its origin a political or legislative movement. It is an organized social effort to win individuals to sobriety and to free the com-

munity from the evils that attend upon the common sale and consumption of intoxicating liquors. The process of raising those who have fallen is at best unsatisfactory. Drink stamps its marks upon them: they emerge from the abyss, scarred with the conflict. Therefore, the next stage in our movement is to save the children, and to raise a generation free from the influence of drink. This is going on in every nation, and people are more and more willing to join in such preventive work.

But we have found that with all the efforts of rescuing drunkards and all the work connected with the education of the children we have only just succeeded in stemming the tide of intemperance. People get tired dealing with the results of the liquor traffic. They say: 'Let us attack it at its source. Let us prevent the evils from arising.' Many nations are represented here, we do not know one another's language, but we all know the signs of the prevalence of intemperance: poverty, disease, crime, and misery, marking its path everywhere, so that the whole of civilization, represented as it is, at this Congress, is crying out for legislation to suppress the evils that flow unceasingly from the liquor trade.

Governments depend upon public opinion. That is true of all countries, in varying degree. It is most immediately true of democratic countries, and of countries governed by popularly-elected assemblies. The more democratic the country the more immediate is the pressure upon the government of the day. The wider the franchise the greater the opportunity on the part of the electors of influencing the government, and it is not without significance that our recent triumphs have been won where women as well as men have exercised the franchise. It is true of all social legislation, but temperance legislation most of all, that it depends for its efficiency on the force of public opinion behind it in the men and women who constitute the nation.

Now we come to the practical point—how can we prevail against this organization of the liquor trade, and make the nation's opinion felt in parliament? The thing to do, people say, is to have our own men in parliament, to have our own party in the state, to form an organization of men who shall be Prohibitionists or Temperance Reformers and nothing else. Well, the difficulty we have in our own country—and it may possibly obtain elsewhere—is that we have old established parties; we have divisions of political opinion on other questions than temperance, and I think it would be wholly impracticable dealing with the complicated foreign and domestic affairs which make up the life of a modern state, to establish a temperance party which should be nothing but a temperance party.

On the other hand it is dangerous to entrust the temperance cause to any of the existing parties. What we have to do—and this is the practical problem which I put before the electors everywhere—is to secure that the right men, whatever their opinion upon other questions, men with sound views, are returned to sit in the parliaments of the world. That is to be done by means of the electors—there is no other way.

The main thing, however, is not to get men to parliament. It is the electors to whom the matter must be brought back, for the strength of the movement is in the individual elector. It is not enough to put pressure on at election times. In parliament there are a whole series of questions waiting and jostling each other to be dealt with, and governments take up those questions that are most urgently pressed upon them, not from any necessary indifference towards other questions, but because the most urgent and persistent must receive attention.

Therefore let the elector, even after choosing a sound man, keep pressing upon him the temperance question. If you do this, and have the right man in parliament, it will be found that governments will very speedily become amenable to temperance electors. There is one thing a government always says to itself: 'We must go on being the government of the country, otherwise ruin will follow.' They will always therefore, strive to do the thing that is necessary to keep them alive. There is a clear line of communication between the voters and the government. Let the pres-

sure of the voters be continuous; let it be well organized and well dircted, unceasing and watchful, and the result is certain.

9.—Canadian Temperance Legislation.

(By Controller F. S. Spence of Toronto).

My statement will be brief. The gentleman who presented the first paper at this session paid a generous compliment to our Dominion and the progress it has made in temperance legislation. The liquor problem has to be faced in Canada as in other lands, and we have the special difficulty of a vast area—more than 3,500,000 square miles—with the sparse population of 8,000,000. There are of course compensating advantages. Our new country is filling up with a virile stock, the enterprising and progressive element, the young blood, of the many nations represented here to-day, alive to the importance of developing the best possible social conditions, and prompt to use political power for that purpose.

Therefore Canadian legislation follows public opinion closely, and takes vigorous hold of the issues created by the liquor traffic. You must judge for yourselves of the wisdom or rashness of our laws, by their form and results. Generally speaking our legislation aims at restricting the drink business as far as the general consensus of public sentiment will permit, and delegating to local authorities power of further restriction or suppression, such as local sentiment will endorse.

There are nine provinces in Canada, each having its own system of liquor legislation, all subject to the possible overriding effect of a general national local option law known as the Canada Temperance Act, under which any country or city may vote out all liquor selling. The provincial license laws also embody, in most cases, local option powers applicable to similar or smaller areas, besides various features of general prohibition character. Under this legislation, in the largest province, Ontario, the granting of liquor licenses and the retail sale of liquor are prohibited in more than one-half of the local municipalities. that is, the cities, towns and villages, and townships The exact figures are as follows:— ,

License municipalities	380
No-license municipalities	442
Total	822

In the largely French and Roman Catholic province of Quebec, the so-called ,wet' and 'dry' divi-ion i- as follow-:

License municipalities	324
No-license municipalities	648
Total	972

The province of Manitoba prohibits liquor selling in 72 municipalities out of a total of 132. Nova Scotia permits no liquor selling except in the city of Halifax. New Brunswick has prohibition in 11 out of a total of 17 counties and cities. Prince Edward Island prohibits all sale for beverage purposes.

The restriction of the drink traffic by general legislation may be illustrated by the conditions that prevail in the city of Toronto, of which I have the honour to be a Controller. The population is about 400,000. The number of retail liquor licenses is 160. The license fee is $1,600, equal to 4,000 guilders, with an additional impost of a percentage of all bar-room receipts above a certain figure. Every license shop or bar is closed from seven o'clock on Saturday night till six o'clock on Mon-

day morning, on every public election day and on Christmas. There are many other restrictions imposed upon the business.

Licenses are issued and the liquor law is enforced by special officers appointed by the government for the performance of that duty. This work is well done.

Through the courtesy of the governments of the Dominion and the province of Ontario, I am able to place in the hands of a number of delegates, copies of some of these liquor laws and reports of their operation. I am also able to supply you with some maps and diagrams illustrating some of the facts and conditions which I have endeavoured to summarize.

As to the future of the temperance movement in Canada I have only to say that the tendencies and forces which have produced the present situation are operating without observable diminution. Practically all the Christian churches, Roman Catholic and Protestant, are working vigourously, for the extermination, as far as possible, of the drink evil.

The strenuous requirements of all phases of the active life of this young country, include the exclusion of any indulgence that might impair keenness of perception, steadiness of nerve, or clearness of judgment.

There are well-informed students of our social life and movements, who to-day feel as confident that ultimately the liquor traffic will be totally prohibited by law in Canada, as they do that the sun will rise to-morrow morning.

10. Alcohol in Colonial Possessions.

(By Rev. John Rauws, of Rotterdam.)

1. The task of the Colonial Governments on behalf of the people and their colonies is the practice of guardianship.

2. In the practice of guardianship we ought to have in view amongst many other things, the moral education whereby good is promoted and wickedness prevented and fought against.

3. The drinking of alcohol as a means of enjoyment brings ruin, and therefore it must be avoided.

4. With gratitude it may be affirmed that the Colonial Governments are making earnest endeavors to keep alcoholic liquors out of the reach of the natives, especially by placing high excise duties on alcohol and also by passing laws of prohibition.

5. Experience teaches us that the placing of high excise duties on the article does not sufficiently prevent the danger of alcohol. Therefore to absolutely avoid all danger we must pass laws prohibiting the importation and the use of alcohol.

6. It is our duty to prevent the evil and thus do good to the natives. The preaching of the Gospel is necessary as this is the source of all blessings for this as well as the future life. Those who are fighting against the evil ought to seek co-operation with Christian Missions.

(By A. J. G. Walbeehm, of The Hague.)

1. Among European peoples, looked at as a whole, the use of alcohol in the last few years has declined considerably.

2. The use of alcohol among the native population of Java and Madura, grows continually, although it is not yet a question of its regular use by the great masses.

3. On account of political and economical reasons, a prohibition law for natives is necessary in Java and Madura and to be wished in those regions of our foreign possessions where it is possible to employ it.

4. A prohibition law like the above will be completely approved of by the great mass of the Javanese people.

5. It is desirable to place also the Chinese under such a prohibition law, although with them, it is not to be expected that it will meet with approval.

6. Regarding other foreigners from the Far East, there is nothing which could prevent a similar measure from being put in force.

7. As to Europeans, all that is necessary is a prohibition to convey or sell alcoholic drinks to persons to whom their use is forbidden.

(By Hans Paasche, of Berlin.)

In Africa total abstinence is necessary for the conservation of:

(*a*) The welfare of the body, mind and spirit of the individual.

(*b*) The social life of the Europeans.

(*c*) The welfare of the natives which is menaced by the use of alcohol.

11. International Action Concerning the Liquor Traffic in Colonies.

(By Baron Joseph Du Teil, of Paris.)

It is shown to-day that the rights of entry and access established by the first Conference at Brussels (1889-1890) and revived at the following conferences (1899 and 1906) have only lessened the growing advance of the importation of spirits into the colonies, which imposes on the signatory powers to the general Act of 1890 the moral obligation to study immediately and to apply in the immediate future protective accessory measures against the dangers arising from alcoholism among the native races, viz.:—

1. The control of the quality of alcohol imported or manufactured in the place, so as to prevent the use and sale of impure or adulterated products.

2. The limitation of the degree of alcohol in the spirits in question in such a way as to render it impossible to import or supply them except in the same condition in which they may be consumed, so as to avoid the use, much too frequent, of alcohols, of 80° or 90°, which, originally free from impurities, may be mixed with toxic matters at the time when they are prepared so as to make them drinkable.

3. The prohibition of private or domestic manufacture (which has the double fault of being at once imperfect and secret) by the prohibition of the importation and sale of small stills and by the detention of the same.

4. The absolute prohibition of the importation or manufacture of all liqueurs of the type of Absinthe.

The adoption of these accessory measures will succeed, if not in restricting the use of alcohol in the colonies, at least in arresting its progress, in hindering the plague which it causes, until the time that the economic and financial conditions of the colonies allow of the prohibition, first of alcohols intended for the use of the natives, and afterwards of all spirituous liquors.

12. Temperance Progress in Quebec Province.

(By Justice E. Lafontaine, of Montreal.)

With my colleague, Mr. Spence, I represent Canada, an autonomous nation within the British Empire, of which it forms an integral and important part. It has two languages. French was spoken by the first colonists and is still the tongue of the greater part of the province of Quebec and some other sections. Both are official in parliament.

Two questions have been discussed this afternoon, the necessity for organization, and the form that organization ought to have. On the first we are all agreed: a mob will never win a victory. On the second, different opinions have been stated, specially in reference to whether such work should be religious or secular. It seems that no absolute rule can apply, and the local conditions must be considered. In countries in which religious sentiment prevails, it would be a mistake not to take advantage of the powerful aid that may be obtained from the church and its ministers. If the question of temperance is a social one, it has also a moral aspect, and as such belongs to religion.

In the Canadian province of Quebec the temperance movement among Catholics was inaugurated by Archbishop Begin and Archbishop Bruchesi, who organized societies in every parish of their respective dioceses. There are also two general associations, the Anti-Alcoholic Leagues of Quebec and Montreal. Such has been the success of this work, that already through the local option plan, the sale of spirituous liquors has been prohibited in 648 out of a total of 972 municipalities, and it is probable that in the near future prohibition will rule in the province of Quebec.

13. Paroling Accused Inebriates.

(By Judge W. Jefferson Pollard, of St. Louis.)

In the police court in the city of St. Louis, in the state of Missouri, U.S.A., an interior city of more than seven hundred and fifty thousand inhabitants, I began my career as a provisional police judge, twenty-one years ago.

More than ten years ago, I began as a provisional judge, and, for the last eight years, as the regular judge of the court, to accept almost daily total abstinence honour pledges, signed voluntarily, in lieu of fine or imprisonment, and made the plan part of the work and machinery of the court. In those cases of offenders arraigned for drunkenness or petty offences growing out of drunkenness, I pursued the following plan:

The offender signed the following total abstinence pledge for a stated period, a year:

As evidence of my appreciation of the opportunity given me, by the judge of the above-named court, to become a sober and better citizen, in staying the fine imposed on me this day, I hereby freely and voluntarily sign the following:

PLEDGE.

"I will abstain from the use of intoxicating liquors of every kind and character for the period of one year from date."

This voluntary honour pledge, not sworn to by the defendant, was in every instance taken in open court, by the judge; the offender to report to the court in person, either at the court or elsewhere, at such times and places as the judge may direct, in order that the offender may lose no time from his employment.

If the pledge is kept, no fine or imprisonment is demanded. The punishment is withheld, though assessed, on promise of the defendant to be of good behaviour by signing the pledge.

This plan puts the responsibility squarely on the judge and makes the defendant responsible to the court. It compels the offender to understand that it rests with him to work out his own salvation and reform himself.

Signing a pledge by a defendant is visible evidence of his promise to be a sober and better citizen, and acts as a moral stimulant and a legal restraint, because of the punishment that will follow if the pledge is broken.

The judge must use discrimination in administering the pledge, so as not to cheapen it, or bring it into disrepute.

One might as well ask a habitual drunkard to sign a pledge not to have a cold as to ask him to sign a pledge not to drink. I acted as my own probation officer, and accepted the pledges from the offenders myself, and during that time only five per cent of those who signed the pledge have violated it.

If any of this ninety-five per cent returned to drink (and there can be no question but many of them did), they did it so adroitly and moderately as not to again disturb the public peace or that of their family, and in this respect I won a victory.

14. The National League Against Alcoholism.

(By F. Riemain of Paris).

The organization of the campaign against alcoholism requires at the same time centralization and decentralization.

1. Decentralization.

Decentralization appears to us as primarily requiring the creation of anti-alcoholic committees, or district departmental, and from the professional and religious societies.

A. District of Departmental Committees. The creation of these committees is justified.

1. Because the forms of propaganda vary according to the districts concerned.

2. Because the leaders of the anti-alcoholic movement residing in the capital cannot devote themselves to those personal inquiries indispensable for obtaining the results desired.

3. Because in the capital it is impossible to check the affirmations made as to matters of fact.

4. Because the district of departmental committees, having a more restricted field of action, are able to work the field more thoroughly.

B. Professional or religious societies. As no force ought to be ignored in the fight against alcoholism, so it is useful to have the large societies which are formed from all those who have the same faith or politics or who are of the same profession. It is undeniable that our great societies, added to the forces with which they are placed in line, will produce a great force, resulting from one religious faith or common social interests, which will contribute most powerfully to the success of our cause.

The professional societies are not less useful. They permit, indeed, of the use of certain means which the other anti-alcoholic workers in general are liable to employ. This admits of appeals which have more chance of being heard because they are made in special terms to a certain category of individuals; experience, moreover, proves this: The railway temperance societies, for example, in most civilized countries, and notably in France, have obtained remarkable results.

2. Centralization.

If it is useful to have the religious and professional societies, and the district committees, it is also indispensable to unite in a central council all those who are fighting against intemperance, in no matter what way. The modern world, as a matter of fact, is evolving more and more rapidly towards democracy, and democracy is the law of the majority. In order that temperance workers may have the greatest possible influence, it is necessary then, at a given moment, that they should be able to avail themselves of the united strength of all, and form a wall of public good against the army of those interested in general intoxication.

Further, the establishment of a central council, has the great advantage of uniting those who have entirely in view the public good, which they hope to realize by different means; and whom prolonged contact with each other will teach mutual esteem and the avoiding of misunderstandings and will reduce to a minimum the contradictions which may exist among their opinions.

Divisions are almost always the result of ignorance: if the anti-alcoholic army is to be united, it is necessary that the chiefs know all their troops.

15. Clubs and Settlements.

(By J. W. Theobald Harvey of London).

Temperance work has considerably expanded since the early days when 'signing the pledge' was the one cure for the evils of intemperance. Gradually the outlook has widened, and temperance workers are recognizing more and more that the tavern provides for a certain demand of human nature which is not necessarily reprehensible. Good company, interchange of opinion, as well as more amusement or refreshment, are cravings demanding satisfaction. The recognition of these facts has led to the creation of clubs, settlements, &c.

1. To take a typical settlement in London. Situated in the midst of a neighbourhood of mean streets, occupied, if not overcrowded by, the earners of small wages, this settlement provides in its various branches, for amusement, recreation, instruction, &c. Not definitely started as a part of the temperance campaign, it nevertheless is essentially an aid to temperance. Experience shows that it becomes almost imperative for the 'settlers' to be abstinent.

2. A typical club. This is somewhat different. There are no residents as in the settlement, but those who are interested come from time to time to help in the work. Here again provision is made for recreation, amusement, debate and refreshment, the latter being supplied at a bar free from alcoholic refreshment.

3. A third effort in connection with a well-known church while combining some of the features of club and settlement is unique in other respects. 'A public house without beer,' where food and drink are provided at low prices, and where a club and a games room offer the comforts of a parlour and the opportunity of billiards, &c. Close by, and under practically the same management, may be found an institution specially for the use of factory girls during the dinner hour, where dining rooms are open, and a play room as well. Opportunity is given for the girls to cook their own food, and encouragement is offered for neatness and good order. The same effort includes help for the homeless and hopeless of a practical nature.

These are merely typical illustrations of what may be done in indirect ways to fight the tavern. They may be multiplied manifold. They are all in London. Many other of the large English towns have institutions of similar character. Indirect

methods are of great importance, and are necessary to support the essential work of teaching that alcohol is evil in itself and its surroundings.

The fact must never be overlooked that personal abstinence is the one real panacea for the evils of intemperance.

E. LAFONTAINE,
F. S. SPENCE.

APPENDIX No. 29.

EXHIBITIONS.

LONDON, March 31, 1912.

DEAR SIR,—I beg to submit the following report of the operations of this branch of the service for the twelve months ending March 31, 1912.

Acting under the instructions of the late Minister of Agriculture, I left Brussels on the 3rd of September, 1910, for London, in order to prepare for our participation in the Festival of Empire and Imperial Exhibition, held at the Crystal Palace, London, and after considerable negotiating secured the site for our building, on which we proceeded to erect a replica of the central parliament building in Ottawa, on about a two-thirds scale.

The site of the grounds of the Crystal Palace is almost too well known to need any description, being without a doubt the finest ground for an exhibition in the city of London, with only one drawback, perhaps, the distance from the centre of the city, but this difficulty was greatly overcome by the electrification of the London, Brighton and South Coast railway from Victoria to the Crystal Palace, who were then able to make the journey from the West End to the Palace in about twenty minutes. Shortly after our building was opened labour troubles commenced amongst the employees of the railroads, which had the effect of cancelling 65 excursion trains from the north of England and also affected other sections of the country which were dependent on the steam roads.

The contract for the erection of the building was given to Messrs. Humphreys, Ltd., of Knightsbridge, who did the work to my entire satisfaction. The most difficult part of the replica, proved to be the painting, more especially so on account of the wet weather we encountered, making it almost impossible to get a lasting colour, but after due perseverance we managed to strike it fairly well, and have received many compliments on it; I suppose the greatest compliment we had was the number of people who were continually tapping the walls with their sticks, &c., in order to see whether they were really stone or not, at the same time doing a certain amount of damage.

The exhibition was opened officially by His Majesty the King on the 12th of May, but as the roads were simply impassable the authorities kept His Majesty in the Palace itself, and therefore we did not open our building although we were quite ready to do so. After bringing a certain amount of pressure to bear on the management we were able to have the roads put in such a condition that we were able to open on the 16th of May.

The exhibit was divided into sections, in which were shown the products of agriculture, horticulture, forestry, fisheries, specimens of Canadian minerals and fauna, also in the agricultural section were shown some types of Agricultural machinery such as ploughs, harrows, seeders, mowers, binders and fanning mills.

The mineral section proved to be one of the most attractive of all the exhibits. In one large show case were shown silver ores, refined silver, asbestos and its products, and other ores, while on the floor itself were table cases, containing gold quartz, alluvial gold, gold nuggets, also small hand specimens of many other different ores. In another section was a scene depicting the aurora borealis, indicating that Canada's mineral riches extended to the Arctic regions. We have also added to our exhibit a dissolving view of the Cobalt silver camp, showing in the first picture the country as it was before railroad building was commenced; the second, showing how the silver was discovered during the course of construction of the railroad; the third picture shows the town and district of Cobalt to-day; the whole scene being worked by a series of dissolving lights; this proved to be a great drawing card. Near this section was a very fine display of marble principally from Ontario and Quebec; this exhibit proved very attractive to builders and contractors.

The centre feature of the building represented a huge iceberg, in the recesses of which were shown fruits preserved in bottles, by a special process, with the inscription, 'Fruit from Rudyard Kipling's Lady of the Snows, Grown in the Open.' This was very interesting to many of our visitors who had evidently read the poem. We also had commercial fruit shown in boxes and baskets, the apple display being particularly effective.

In the agricultural sections we had two large panoramas, the one called past and present, showed in the foreground mounted specimens of wild animals and birds as they appear on Canada's western lands, whereas the picture itself showed a farm with its buildings, fields of grain, and grazing stock, also mountains with beautiful fruit farms in the valleys. The other picture showed Canada from the head of the Great Lakes to the Pacific Coast, with its vast prairie farming lands and elevators for the handling of the grain. With this picture we had a model railway in operation showing how the grain is transported, and how the trains run through a great spiral tunnel, giving an idea of the difficulties to be overcome in railroad building in Canada. In separate cases were shown natural and manufactured agricultural products, such as flour and cereals from the different Canadian mills.

The forestry section contained a large number of fine specimens of pulp wood, as well as soft woods for building and decorative purposes, and painted scenes of a pulp wood forest, and also one of a beaver dam, with live beavers working in the foreground, over which was the inscription, 'The Earliest Known Wood Cutters and Dam Builders in the World.'

The fish exhibit consisted of a numerous collection of Canadian fish, most of them mounted in their natural skins, the remainder being plaster and gelatine casts.

The decorations of the building were entirely executed by members of the Canadian staff and were very much admired and praised. The outstanding feature of the decorative scheme was a series of pictures made from grains and grasses, which astonished the visiting public, who were hardly able to believe that such could be the case, other features were the large number of the very rare mounted heads of wild animals, and a series of remarkable transparencies that formed a frieze all around the building, and illustrated the importance of the industries of the Dominion.

In the early summer we had the privilege of receiving a great many prominent persons, among them being His Royal Highness Prince Arthur of Connaught, and Ex-President Diaz of Mexico. We also met many Canadians, some of whom were The Right Hon. Sir Wilfrid Laurier, late Prime Minister of Canada, the Hon. Geo. E. Foster, Minister of Trade and Commerce, Col. the Hon. Sam Hughes, Minister of Militia, the Hon. John Haggart, late Minister of Railways and Canals, also many others, including senators and members of parliament, who all seemed quite delighted to see the keen interest taken in our exhibit.

In summing up I might say that the exhibition closed on the 31st of October, and although we had not such a large aggregate attendance as we have had at other

exhibitions I consider that we have done just as good if not better work here on account of the fact that the people we had were nearly all interested in Canada, and not merely exhibition sight-seers. On some days we had as many as 60,000 people in the building, but owing to our large floor space the building was never overcrowded, and therefore everyone was able to see the exhibit to the best advantage.

We are now preparing our exhibit for this year at the Crystal Palace, which I earnestly hope will be a credit to Canada and to the Department over which you preside.

The whole respectfully submitted,

WM. HUTCHISON,
Canadian Exhibition Commissioner.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 30.

TOBACCO.

OTTAWA, March 31, 1912.

SIR,—I beg to submit a report of the work done by the Tobacco Division from April 1, 1911, to March 31, 1912.

As during the previous season, the greater part of the work of this division was carried on at the experimental field of the Central Farm at Ottawa and the experimental stations of St. Jacques l'Achigan, Que., St. Césaire, Que., and Harrow, Ont.

At the Experimental Farm eighteen varieties of tobacco were sowed on April 21, dry seed being used. Some varieties, such as 'Comstock Spanish,' 'Canelle,' 'Big-Ohio,' and 'Blue Pryor' were grown chiefly for the production of seed, while others were tried with a view to ascertain if they were adapted to our climate and conditions.

The Central Experimental Farm is well situated for such experiments, being almost at the centre of the tobacco growing districts of Canada. With a few necessary changes, observations made at Ottawa may serve as a guide to Quebec as well as to Ontario growers.

Among varieties lately imported or revived, some such as 'Brazils' and 'Aurora' were expected to fill a long felt want in our tobacco industry, which our farmers have, so far, been unable to produce with advantage: a tobacco suitable for use as fillers, with the proper aroma, the proper strength, and sufficient productivity. The production of 'Cubans' in the Okanagan valley has not been neglected, the 'Cuban' is one of the varieties tried during the season 1911-12 in the province of Quebec, on our station of St. Jacques l'Achigan.

Other varieties such as 'Souffir' and 'Rustica Russes,' were used to demonstrate the possibility of obtaining in Canada tobacco with a sufficient percentage of nicotine to be used profitably for the extraction of this alcaloid. Nicotine, as is well known, has been selling at very high prices, particularly in Europe during the last few years, and European wine growers and horticulturists have experienced great difficulty in securing sufficient quantities of this product. It would be interesting therefore to find out if Canadian industry can produce an article for which there is such a great demand.

The spring of 1911 was exceptionally favourable to the growth of seedlings.

The beds were sown on the 21st of April, the seedlings were ready to be set out on the 21st of May, and the setting out on the various plots was done between the 22nd and 27th May.

Heavy rains, during this period, helped the seedlings, but interfered with the application of poisoned bran, used for destroying cutworms; the latter were therefore very troublesome.

It is impossible, as yet, to give the final results of the field experiments carried on in 1911 on the Experimental Farm. Most of the tobacco from the crop of 1911 is now being fermented, and it will be necessary to wait until the fermentation is over.

It was observed on the field, however, that tobacco of the 'Brazil' variety may yield in Canada very nearly as much as the 'Comstock Spanish,' that is from 1,000 to 1,200 pounds per acre. If the taste and aroma of this 'filler' tobacco find favour with the Canadian manufacturers it will find a ready market. Being an average yielder, it may be sold with profit at the average price per pound, while the 'Cuban,' which was tried in Quebec, gives too light a crop to be grown with profit, at the price offered by the manufacturers.

The 'Aurora' is a petioled tobacco which, we were told, is used in Ohio as filler for cigars. It does not appear to be very suitable for this purpose; however, we shall not give an opinion on the matter until this tobacco has been fermented. It is fairly early, but cures very easily. It takes, in curing, a very pleasant brick colour, and while it may not be suitable for the cigar industry, it is certainly a very good type of pipe tobacco. Although the petiole is very prominent, the proportion of stems in this tobacco is not larger than that observed in the majority of varieties with sessile leaves, the stems being comparatively fine.

Among the varieties examined with regard to the production of nicotine, some have yielded as much as 10½ per cent of nicotine in dry tobacco, although grown in a light soil.

The possible production of nicotine per acre has yet to be figured out. The delay in constructing the warehouse, where we are now busy sorting and fermenting the products, has made it impossible for us to complete this experiment, the results of which will be given out later.

A warehouse for the sorting and fermenting of our tobacco has been built on the Central Experimental Farm. This is a great improvement in the equipment of our division.

In future, we will handle our crop from the seedling to the finished product, that is, when the tobacco, after being sorted and fermented, is ready to be submitted to the manufacturers. This warehouse is in charge of a foreman, who is held responsible for the sorting and fermenting. When we have a sufficient number of expert workmen, we will be able to prepare our products so as to comply with the most exacting requirements.

Unfortunately, the construction of this warehouse was greatly delayed; it was ready at the end of March while it should have been completed by the end of August. Therefore, although the quantity of tobacco to be handled for the first year was comparatively light, the work of fermenting could not be started before the 11th April when the first pile of tobacco was built up. It will not be possible to give a definite opinion as to the value of the products until the fermentation is completed.

Our whole time was given to the handling of the crop which was in danger of spoiling, owing to the high temperature of the rooms in which it had to be kept; this is the reason for our postponing the publication of some results that we were anxious to give out earlier.

STATIONS AT ST. JACQUES L'ACHIGAN AND ST. CESAIRE, QUEBEC.

The results of the work carried on at these stations during the season 1911-12 are set forth in Bulletin No. A. 13, of the series of the Tobacco Division.

The season 1911 was particularly favourable to the growth of the seedlings and the setting out operations were started on May 20, which is an early date especially for St. Jacques l'Achigan.

However, a long period of drought, especially in the northern counties, endangered the crop for some time. The tobacco ripened early as a rule, and the products were a little shorter and a little stronger than is usual in a favourable year. The effect of frequent cultivation was well marked; only the fields thoroughly cultivated gave normal crops.

At St. Jacques station, tobacco was grown as follows:—

1 acre of Yamaska.

1 acre of Big-Ohio x Sumatra.

1½ acres of Cuban.

¼ acre of Turkish tobacco.

At this station all the seeds were sown in cold beds, after the method described in our Bulletin No. A. 12, with the exception of one hot bed. Mushrooms appeared in such quantities on the hot bed that it had to be abandoned, whilst the cold beds came out extremely well, maintaining at night temperatures from 48 to 53 Farenheit; during the day the temperature often rose to 80-85 Farenheit, but never above.,

These cold beds have now been in use for two years, and there is no longer any doubt as to their efficiency. No fermenting manure is used, therefore, there is less moisture, and a more even temperature. The seedlings are almost as early, a great deal stronger, and the beds, as well as the plants, are less affected by disease.

Thin seeding, not over one-seventh of an ounce of seed for 100 square feet of bed, the use of moderately hot beds, and better ventilation, such is the way to secure strong and early seedlings. Well managed cold beds made, after the method recommended by Mr. Chevalier, will fulfil these conditions, even in the northern counties in the province of Quebec.

The yields in weight in 1911 did not fully answer our expectations. The crop suffered from the drought, as well as those of the neighbouring farmers, but we note a gradual increase from year to year in the yields; this is the result of better cultivation and greater fertility.

The crops at St. Cesaire were as follows:

1 acre of Yamaska, 1 acre of Big Ohio x Sumatra, ½ acre of Comstock,

The latter were grown chiefly for seed production.

The cutworms were very numerous and interfered with the setting out; about 6 per cent of the seedlings had to be reset. The drought was not so severe at St. Cesaire as in the northern counties, and our crop looked promising when it was severely injured, on the 12th of August, by a hailstorm, which destroyed or injured about 30 per cent of the leaves as well as a large number of seed plants.

This is the third time since we started experiments at St. Césaire that our fields were damaged by hail, and that the work done at this station is almost completely lost.

The district of Yamaska has regularly suffered from this cause during the last few years. It might be interesting to see if such disasters could not be prevented by means of 'hail preventers' similar to those that have given such good results in France for the last three years.

The station of St. Césaire has been abandoned and replaced by a larger station (about 65 acres) established at the very outskirts of the town of Farnham. It is hoped that more help will be available; the means of access are easier, and, owing to the greater area, the varieties will be grown on a larger scale. Up to the present time, owing to the small size of the experimental plots, the quantity of tobacco of each variety has been quite insufficient to admit of proper handling.

The enlargement of our station for the district of St. Césaire will enable us to make full use of our new warehouse at the experimental farm; all the products of

the station will be shipped to the warehouse as soon as they are out of the curing sheds.

Mr. Pierre Leduc, on whose farm the old station was established, has well understood the reasons which caused us to ask for the cancelling of our lease and has willingly granted our request. I seize this opportunity to recognize his ability and the zeal which he has displayed during the three years that he was in charge of this small experimental farm as foreman. The few results that we have obtaineed, in spite of unfavourable weather conditions, are largely due to his initiative and efforts.

An interesting article on the three years rotation which has been adopted on our experimental stations will be found in Mr. Chevalier's report.

It is not claimed that this rotation is the best for all Canadian farms, but we consider it as the shortest rotation that can be used wherever tobacco is grown. It is hard to realize how many farms have been ruined by growing tobacco exclusively, with insufficient manuring.

The station of St. Jacques l'Achigan gives us a striking instance of this fact. For the last three years, the yields obtained in tobacco, grain, and clover have been steadily increasing and this increase has been maintained (except for a light decrease as regards clover), even during the dry season of 1907. The cultivation, the quantity of fertilizers applied, have been the same, but the yield of the crops increases as the land becomes richer, cleaner and easier to work. It is hoped that the yield will be still greater in 1912, when we go back to our first tobacco field, which has had the full benefit of the rotation.

The experiment with chemical fertilizers used in conjunction with farm yard manure, and which was carried at the station of St. Jacques l'Achigan, has generally confirmed the results of experiments carried on in 1909 and 1910; furthermore it brings out the important part played by phosphoric acid in the soils of this district in spite of the high proportion of this element in the land under test.

The analysis reveals about 0·70 of phosphoric acid in tobacco lands of Quebec province, however, an application of superphosphate, even in very small quantity, gives striking results, whilst, in the district of Essex, where chemical analysis reveals only 0·18 of phosphoric acid, superphosphate has very little effect. It is hoped that this division will soon be able to make a study of the various tobacco soils in Canada. Although the soils of Quebec contain an important stock of phosphoric acid, it is clear that the greater part of the latter is not held in an available form, but a problem which requires investigation is the possible affinity of some varieties for some elements. This affinity is no longer in doubt, and must be reckoned with when the results secured in Essex are compared to the results in Quebec; in one case the variety tested is the 'White Burley'; in the other case the varieties come nearer to the seed leaf types, which are supposed to have better burning qualities and a finer and more elastic texture.

The Cuban variety tried in 1911 on the station of St. Jacques l'Achigan with the Brazilian variety tried at Ottawa during the same season, did not give the results that were expected. The yield in weight, under the most favourable conditions, did not exceed 774 pounds per acre. The price of raw tobacco being 15 cents per pound, the growing of this varity canont be recommended to the farmers of the province of Quebec. However, in a normal year, it is hoped that from 850 to 900 pounds will be obtained, but evidently the hope of obtaining as heavy a crop in Quebec as it gives in Okanagan must be abandoned.

A small plot of about $\frac{1}{4}$ of an acre has been planted in Turkish tobacco. The yield from this small area was 200 pounds of leaf tobacco, which gives a yield in weight of 750 to 800 pounds per acre. This is a better yield than was expected.

As noted by Mr. Chevalier, the cost of cultivation for this tobacco is much higher than for other varieties. Owing to the close setting of the plants, all work must be

done by hand, and the leaves must be harvested separately, as they must be plucked from the plant as soon as they have the exact degree of maturity to give the colour required.

The tobacco from our crop is now at Ottawa; we fear that the quality has suffered from the delay in handling, due to the fact that the warehouse was not ready. The sorting of the crop of Turkish tobacco of 1911 should have been done in the latter part of last fall. In any case the various phases of the growing of this tobacco, as understood in Canada at the present time, are given in a chapter of Mr. Chevalier's report.

HARROW STATION (ONTARIO).

The results of the work on this station during the season, 1911-12, are given in Bulletin No. A. 14 of the series of the Tobacco Division.

The station of Harrow has been enlarged towards the end of the spring of 1911, by the acquisition of a plot of land that stood between the station and the high road from Harrow to Kingsville, a road upon which it was expected to have the main entrance to the station. This purchase enables us to increase the number of plots adapted to the growing of yellow tobacco (cured by hot air). It includes a small ridge, fairly well drained, consisting chiefly of a light loam which seems to be favourable for the growing of yellow Virginia; an orchard of about an acre, and about three-quarters of an acre of stony and rolling land unsuitable for cultivation of any kind. The orchard, which is a little out of the way, will be kept as it is. The stony part has been utilized as a site for the buildings; the residence of the foreman, and a new shed which is used as a curing house and as a shelter for part of our implements.. The spring was very favourable to seeding operations in Essex and Kent, as well as in Quebec. Instances of failure were not nearly so numerous as usual, and the high prices quoted for seedlings at the time of setting out can be explained only by the great demand arising out of the extraordinary increase in the area set aside for the cultivation of white barley in the south of Ontario during the season of 1911. Some growers doubled and even trebled the extent of their plantations, and many of them, having decided somewhat late to plant more extensively than usual, were short of seedlings and had to apply to their neighbours for the same. A notable fact is the increase in the number of beds under glass. This system, which seems to be the only efficient one, and which we have not ceased to recommend since the Harrow station was established, is being more generally adopted. Various sorts of beds have been laid out by Mr. W. A. Barnet, the officer in charge of the Harrow station, who refers to them in his report for the season of 1911, and concludes by some practical advice which should be followed by every tobacco grower.

With the exception of the Virginia, for which very early seedlings are required and hot beds have to be used, the cold bed, which is made up of good materials, sound, sifted and well fertilized, insures at all times a plentiful production of seedlings. The glazed sash gives more heat than the ordinary cotton cover and shelters the seedlings better from rain and variations of temperature. A close watch has to be kept, however, as sunstrokes are to be feared in bright days. The latter may be easily guarded against by raising the sashes and covering the under surface with lime water, fairly thin.

Special attention was given to the growing of yellow Virginias, as in the two previous seasons. The season of 1911 seems to have been more favourable than the preceding ones, so far as the colour of the tobacco is concerned; possibly because the Virginia was grown on a plot better suited for this variety.

The conclusion to be drawn from Mr. Barnet's experiments is that it is difficult to obtain, in our conditions, anything but a light red leaf. The yellow leaves (lemon yellow), in so great demand, are always the exception. However, if the proportion of

light red leaves in a crop is sufficient, it is not difficult to find a use for such crop in Canadian factories. The demand is so great that prices will be profitable for a long time to come (20 to 25 cents a pound), unless the area planted in yellow tobacco increases out of all proportion to the requirements. The production of tobacco with a coarse tissue, poorly ripened and cured green or red brown, is to be avoided. Mr. Barnet says that the best way to avoid this defect is to plant as early as possible during the latter part of May, if possible, and to cure only two lots of tobacco in the same season, in the special curing farm used for the curing of yellow tobacco. Each curing period, including the time spent in filling the kiln and removing the products takes about ten days. An experience of three years has shown that a third curing period ends always too late in the season, when the right temperature can no longer be maintained in the kiln. At that time, the products, even those that have sufficiently ripened, are generally undergoing a second growth, due to the effect of fall rains, they get green again, are swollen with water, and cannot take the required colour, in spite of all the precautions at harvesting time and during the curing process.

We have tried to ascertain if it was absolutely necessary to split the stems of Virginia plants before taking them in the kiln shed. By leaving the products on the field a fairly long time before taking them in the special curing barn, Mr. Barnet has secured, with tobacco harvested in the usual way (cutting the plant at the base of the stem) practically the same colour as when the stem is split from top to bottom and the tobacco is taken the same day in the kiln. The only thing necessary is to lengthen a little the last phase of the curing period, as it is more difficult to cure solid stems than split stems, as might be expected.

This observation has little importance as regards the quality of the final product, but this system of harvesting has some advantages from a practical point of view. It is quicker than the American method and does away with the use of the special knife. Some training is required before this knife can be handled with sufficient speed without tearing the leaves.

As during the previous years the yields in weight of our crop of burley were much above the average. Now that our station is established permanently, it will be possible to locate exactly the site of the plots on which the various rotations are to be carried, and it is expected that the yields of the station at Harrow will show the same gradual increase as was observed at St. Jacques l'Achigan.

The work done at the Harrow station, during the last three years, shows conclusively that the land was exhausted when possession of it was taken, although it was excellent tobacco land. The striking effect of nitrogenous fertilizers on the fields of Burley under experiment cannot otherwise be accounted for. The quantity of potash and especially of phosphoric acid could be reduced; the results obtained by Mr. Barnet are conclusive on this point. It should be noted, however, that all the plots under experiment have been manured previously with farmyard manure. It is possible that ten tons of farmyard manure may have left in the soil all the potash and all the phosphoric acid required by a normal crop of Burley, and counterbalanced, to a certain extent, the effect of the potassic and phosphoric mineral fertilizers used as complements.

Mr. Barnet's conclusions throw a light on the advantage of using farmyard manure in conjunction with chemical fertilizers. On sandy land, with coarse particles, such as those of South Essex and Kent, it is hard to maintain for a long time a sufficient supply of humus. To do so one must resort to heavy manuring or to ploughing under leguminous plants.

The comparative failure of a part of our tobacco fields where a crop of rye had been ploughed under, should be sufficient to prove that all plants are not suitable for green manuring. On the other hand, the delay in the ripening of Burley, observed on another plot, where clover had been ploughed under, shows that it is better, in the case of a four years' rotation including tobacco, corn, grain and clover, to adopt the

following order: tobacco, grain, clover and corn. There is no serious objection to have the tobacco come after corn, provided a good application of manure is given to the soil in the spring.

One fact was clearly brought out by the experiments at Harrow; even in a dry season, rather unfavourable to the action of chemical fertilizers, the money spent on the latter has been at least doubled, almost in every case. Mr. Barnet recommends the use of these fertilizers in all their forms, as the best investment that a farmer can make. The conservation of his capital; (the fertility of his farm; the increase in the interest on the latter, (increased yields); and the desire to maintain his reputation (products of higher quality); these are certainly three convincing arguments for all those who think that all the yields of a large farm may be gradually exhausted, trusting to time and fallowing to make good the losses suffered by the soil.

The combined curing barn built on the Harrow station during the season 1911, has given very good results. With a reduced floor surface it will accommodate the yield of a field of three acres of Burley; the ground floor is used as a shed for the greater number of agricultural implements. The ventilators in galvanized iron give quite as good results in ventilating the building as the rotative ventilators used in our first curing house, and are much less expensive.

The galvanized iron roof protects the building against the effects of lightning without interfering with the curing of the products. It should be very hard indeed for a grower of Burley to build a cheaper and more efficient curing house.

PRODUCTION OF SEED.

Besides the experiments carried on at the various stations, we have grown tobacco seed in sufficient quantity for the free distribution which is made, every year, at the beginning of spring, to the growers applying for the same. Each sample distributed contains about one-quarter of an ounce of seed of good quality, carefully selected on the field, and carefully cleaned in the laboratory before packing; all the seeds deficient in weight are eliminated. The number of samples obtained in 1911 of various origin, is shown in the following list:

Comstock Spanish—	
St. Césaire Station	1,582
Experimental Farm, Ottawa	1,183
Canelle—	
Experimental Farm, Ottawa	1,232
Blue Pryor—	
Experimental Farm, Ottawa	243
Yamaska—	
St. Césaire Station	42
St. Jacques' Station	43
Big Ohio x Sumatra—	
St. Jacques' Station	147
St. Césaire Station	47
Big Ohio—	
Experimental Farm, Ottawa	109
White Burley—	
Harrow Station	531
Total	5,159

Making a total of about 80 pounds of selected seed, valued at $480 to $500.

DISTRIBUTION OF TOBACCO SEED.

The number of tobacco seed samples distributed in 1912, amounted to 3,184 composed as follows:—

Comstock Spanish, St. Jacques	1,156
" " St. Césaire	261
Canelle	1,171
White Burley	326
Havana Seed Leaf	93
Yamaska	58
Connecticut	47
Cuban	31
Montmelian	11
Blue Pryor	9
General Grant	8
Big Ohio x Sumatra	7
Big Ohio	3
Verel	1
Warne	1
Hazlewood	1

RECEIPTS.

The sale of the products from the various stations has brought the following receipts for the season 1910-11:

Harrow Station	$ 3,212 03
St. Jacques' Station	354 82
St. Césaire Station	103 34
Central Experimental Farm	307 30
Total	$ 3,977 49

The tobacco of St. Césaire Station has been injured by hail, which accounts for the poor receipts from this establishment. The best results from a financial point of view have been secured on the Harrow Station. The allocation for this station, for the season 1910-11, was $3,664.70, including about $500 set aside for the improvement of the land and the purchase of implements, which leaves about $3,100 for working expenses. As a matter of fact the expenditure has not reached this figure, therefore the Harrow Station is self-supporting, and, not counting the salary of the superintendent, not only covers its expenses but pays the interest of the money spent on this establishment. This shows the advantage of having experimental stations of a moderate size. They supply almost free of charge, tobacco in sufficient quantity to permit of making a thorough test of each variety. Again, from an educational point of view, they enable us to show to the growers, in the interest of whom these stations are established, that it is possible for them to obtain as good results as we do and sometimes cheaper than we do.

CONCLUSIONS.

Taken as a whole, the season of 1911-12 was favourable for tobacco growers in the province of Quebec. The seedlings were better than usual, owing to the early spring, and in spite of the prolonged drought which, at times, gave serious fears, an average crop was obtained.

In Ontario the yield of Burley has exceeded, in unhoped proportions, all the yields that have been secured so far. It is believed that the production of Burley in 1911, in the counties of Essex and Kent, reached 15,000,000 pounds. Possibly this estimation is slightly exaggerated, but in any case the area planted in tobacco in 1911 in the province of Ontario was more than double that planted the previous season. The yield suffered from various causes: drought, the inexperience of new growers, and too light manuring, but such as it was, it was almost phenomenal and will probably long remain in the memory of Ontario tobacco growers.

Reports on the next crop predict a return to normal areas, limited in any case by the quantity of manure available, the material and curing houses. It is because they went beyond these limits that some growers suffered serious losses, caused by a lack of help at the time of harvesting and lack of curing houses of sufficient capacity. From an economic point of view the industry of Canadian tobacco still keeps going ahead.

This does not apply to the prodigious development of the growing of Burley in 1911, and which will, result sooner or later, in a slight retrogression, but to the steady progress made in the province of Quebec in the growing of cigar tobacco.

Everything leads us to believe that, before long, the production of tobacco 'binders' will have reached the limit. When three or four establishments of the same capacity as those that are working now at St. Césaire and Farnham will be in full operation, it will be almost time to stop in order to avoid overproduction and the consequent lowering of prices. At that time the areas cultivated will have to be kept in the right proportion to satisfy the increased demand resulting from increase in population. Fortunately, a vast field is still open to the activity of Canadian growers. We still have to produce in Canada filler tobacco suitable for our manufacturers. This problem has been studied for the last two years and it is hoped that a solution will soon be arrived at.

When the Quebec grower is in a position to produce fillers and 'binders' in sufficient quantity for the needs of the market, we hope that he will give his attention to the production of pipe tobacco (seed leaves and Kentuckys), an industry which stands in need of improvement.

I have the honour to be, sir,

Your obedient servant,

F. CHARLAN,

Chief of the Tobacco Division

To the Honourable Minister of Agriculture,
Ottawa.

INDEX TO APPENDICES.

PUBLIC HEALTH.

MISCELLANEOUS.